# SUPPLEMENT.

# The Mining Journal,

## RAILWAY AND COMMERCIAL GAZETTE:

**FORMING A COMPLETE RECORD OF THE PROCEEDINGS OF ALL PUBLIC COMPANIES.**

*[The MINING JOURNAL is Registered at the General Post Office as a Newspaper, and for Transmission Abroad.]*

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**Steam Pumps, Shipbuilders' Tools,**

BAR SHEARS.

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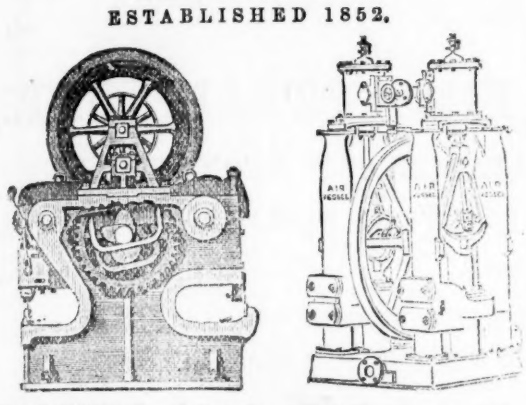

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MANUFACTURERS OF

PUMPING and other LAND ENGINES and MARINE STEAM ENGINES of the largest and most approved kinds in use, SUGAR MACHINERY, MILLWORK, MINING MACHINERY, AND MACHINERY IN GENERAL. SHIPBUILDERS IN WOOD AND IRON.

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IN GOOD CONDITION, AT MODERATE PRICES—viz.,

PUMPING ENGINES; WINDING ENGINES; STAMPING ENGINES; STEAM CAPSTANS; ORE CRUSHERS; BOILERS and PITWORK of various sizes and descriptions; and all kinds of MATERIALS required for MINING PURPOSES.

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|---|---|
| Alloy, No, II., for pinions, ornamental castings, steem fittings, &c. | £120 per ton |
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The prices of castings vary according to the pattern, the quantity required, and the alloy used.

WIRE ROPES, TUBES OF ALL DESCRIPTIONS, &c.

STANDARD LUBRICATING OILS COMPANY, LIMITED.

DARK and PALE OILS for MACHINERY, RAILWAY, and MINING PURPOSES, from TWO SHILLINGS per gallon, and upwards.

AGENTS WANTED.

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BENNETTS' SAFETY FUSE WORKS

ROSKEAR, CAMBORNE, CORNWALL.

BLASTING FUSE FOR MINING AND ENGINEERING PURPOSES,

Suitable for wet or dry ground, and effective in Tropical or Polar Climates.

W. BENNETTS, having had many years experience as chief engineer with Messrs. Bickford, Smith, and Co., is now enabled to offer Fuse of every variety of his own manufacture, of best quality, and at moderate prices.

Price Lists and Sample Cards may be had on application at the above address.

LONDON OFFICE,—H. HUGHES, Esq., 55, GRACECHURCH STREET

PARIS, BRONZE MEDAL, 1867.

ORDER OF THE CROWN OF PRUSSIA.

FALMOUTH, SILVER MEDAL, 1867.

**A DIPLOMA**—HIGHEST OF ALL AWARDS—given by the Geographical Congress, Paris, 1875—M. Favre, Contractor, having exhibited the McKean Drill alone as the MODEL BORING MACHINE for the ST. GOTHARD TUNNEL.

**SILVER MEDAL** of the Highland and West of Scotland Agricultural Society, 1875—HIGHEST AWARD.

At the south end of the St. Gothard Tunnel, where

THE McKEAN ROCK DRILLS

Are exclusively used, the advance made during eight consecutive weeks, ending February 7, was 24·90, 27·60, 24·80, 26·10, 28·30, 27·10, 28·40, 28·70 metres. Total advance of south heading during January was **121·30 metres, or 133 yards.**

In a series of comparative trials made at the St. Gothard Tunnel, the McKean Rock Drill continued to work until the pressure was reduced to one-half atmosphere (7½ lbs.), showing almost the entire motive force to be available for the blow against the rock—a result of itself indicating many advantages.

The GREAT WESTERN RAILWAY has adopted these Machines for the SEVERN TUNNEL; the LONDON AND NORTH-WESTERN RAILWAY for the FESTINIOG TUNNEL: and the BRITISH GOVERNMENT for several Public Works. A considerable number of Mining Companies are now using them. Shafts and Galleries are driven at from three to six times the speed of hand labour, according to the size and number of machines employed, and with important saving in cost. The ratio of advantage over hand labour is greatest where the rock is hardest.

These Machines possess many advantages, which give them a value unapproached by any other system of Boring Machine.

THE McKEAN ROCK DRILL IS ATTAINING GENERAL USE THROUGHOUT THE WORLD FOR MINING, TUNNELLING, QUARRYING, AND SUB-MARINE BORING.

The McKEAN ROCK DRILLS are the most powerful—the most portable—the most durable—the most compact—of the best mechanical device. They contain the fewest parts—have no weak parts—act without SHOCK upon any of the operating parts—work with a lower pressure than any other Rock Drill—may be worked at a higher pressure than any other—may be run with safety to FIFTEEN HUNDRED STROKES PER MINUTE—do not require a mechanic to work them—are the smallest, shortest, and lightest of all machines—will give the longest feed without change of tool—work with long or short stroke at pleasure of operator.

The SAME Machine may be used for sinking, drifting, or open work. Their working parts are best protected against grit and accidents. The various methods of mounting them are the most efficient.

**N.B.—Correspondents should state particulars as to character of work in hand in writing us for information, on receipt of which a special definite answer, with reference to our full illustrated catalogue, will be sent.**

PORTABLE BOILERS, AIR COMPRESSORS, BORING STEEL, IRON, AND FLEXIBLE TUBING.

The McKean Drill may be seen in operation daily in London.

McKEAN AND CO.,

ENGINEERS.

OFFICES,

5, RUE SCRIBE, PARIS

MANUFACTURED FOR McKEAN AND CO. BY MESSRS. P. AND W MACLELLAN, "CLUTHA IRONWORKS," GLASGOW.

SMITH & FORREST,

OIL REFINERS,

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GREASE AND VARNISH MANUFACTURERS,

HOLT TOWN,

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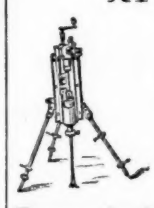
Price List on application.

[ESTABLISHED TEN YEARS.]

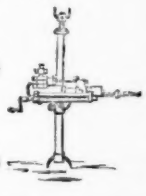
DUNN'S ROCK DRILL,

AND

AIR COMPRESSORS.



FOR DRIVING BED ROCK TUNNELS, SINKING SHAFTS, AND PERFORMING OPEN FIELD OPERATIONS, IS THE CHEAPEST, SIMPLEST, STRONGEST, & MOST EFFECTIVE DRILL IN THE WORLD.



Dunn's Patent Rock Drill Company

(LIMITED).

OFFICE,—193, GOSWELL ROAD

LONDON, E.C.

THE

PATENT SELF-ACTING MINERAL DRESSING MACHINE COMPANY

(LIMITED).

T. CURRIE GREGORY, C.E., F.G.S.

OFFICES,—GLASGOW: 4, WEST REGENT STREET.

LONDON: 52, QUEEN VICTORIA STREET, E.C

IMPORTANT NOTICE TO MINE PROPRIETORS.

MR. GEORGE GREEN, ENGINEER, ABERYSTWITH, SUPPLIES MACHINES under the above Company's Patents for DRESSING all METALLIC ORES. Dressing-floors having these Machines possess the following advantages:—

1.—THEY ARE CHEAPER THAN ANY OTHER KIND IN FIRST OUTLAY.

2.—ONLY ABOUT ONE-FOURTH OF THE SPACE USUALLY OCCUPIED BY DRESSING-FLOORS IS REQUIRED.

3.—FROM 60 TO 70 PER CENT. OF THE LABOUR IN DRESSING, AND FROM 5 TO 10 PER CENT. OF ORE OTHERWISE LOST, IS SAVED.

4.—THEY ARE THE ONLY MACHINES THAT MAKE THE ORE CLEAN FOR MARKET AT ONE OPERATION.

They have been supplied to some of the principal mines in the United Kingdom and abroad—viz.,

The Greenside Mines, Patterdale, Cumberland; London Lead Company's Mines Darlington, Colberry, Nanthead, and Bollyhope; the Stonecroft and Greyside Mines, Hexham, Northumberland; Wanlockhead Mines, Abington, Scotland (the Duke of Buccleuch's); Bewick Partners, Haydon Bridge; the Old Darren, Esgairmwyn, and Ystumtuen Mines, in Cardiganshire; Mr. Beaumont's W.B. Mines, Darlington; also Mr. Sewell, for Argentiferous Copper Mines, Peru; the Bratsberg Copper Mines, Norway, and Mines in Italy, Germany, United States of America, and Australia, from all of whom certificates of the complete efficiency of the system can be had.

WASTE HEAPS, consisting of refuse chats and skimpings of a former washing, containing a mixture of lead, blende, and sulphur, DRESSED TO A PROFIT.

Mr. BAINBRIDGE, C.E., of the London Company's Mines, Middleton-in-Teesdale, by Darlington, writing on the 20th March, 1876, says—"The yearly profit on our Nanthead waste heaps amounted last year to £600, besides the machinery being occupied for some months in dressing ore-stuff from the mines. Of course, if it had been wholly engaged in dressing wastes our returns would have been greater; but it is giving us every satisfaction, and bringing the waste heaps into profitable use, which would otherwise remain dormant."

Mr. T. B. STEWART, Manager of the Duke of Buccleuch's Mines, Wanlockhead, Abington, N.B., writing on 20th March, 1876, says—"I have much pleasure in stating that a full and superior set of your Ore Dressing Machinery has been at work at these mines for fully a month, and each day as the moving parts become smoother, and those in charge understand the working of the machinery better, it gives increasing satisfaction, the ore being dressed more quickly, cheaply, and satisfactorily than by any other method."

Mr. BAINBRIDGE, speaking of machinery supplied Colberry Mines, says—"Your machinery saves fully one-half on old wages, and vastly more on the wages we have now to pay. Over and above the saving in cost is the saving in ore, which is not much short of 10 per cent."

GREENSIDE MINE COMPANY, Patterdale, near Penrith, say—"The separation which they make is complete."

Mr. MONTAGUE BEALE says—"It will separate ore, however close the mechanical mixture, in such a way as no other machines can do."

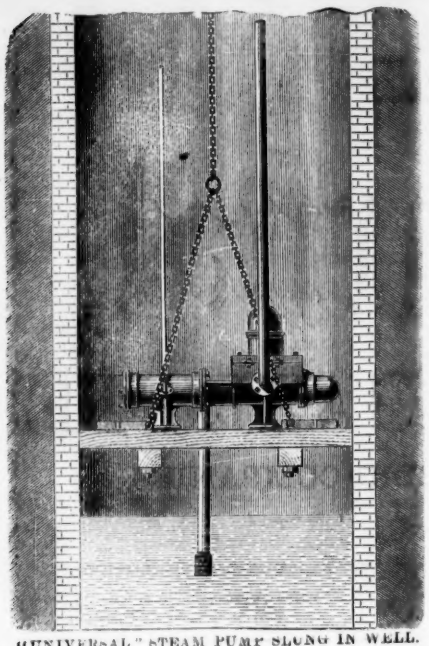
Mr. C. DODSWORTH says—"It is the very best for the purpose, and will do for any kind of metallic ores—the very thing so long needed for dressing-floors."

Drawings, specifications, and estimates will be forwarded on application to—

GEORGE GREEN, M.E., ABERYSTWITH, SOUTH WALES.

# HAYWARD TYLER AND CO.,

MAKERS.



"UNIVERSAL" STEAM PUMP SLUNG IN WELL.

TESTIMONIAL.

RE STEAM PUMP.

Burton-on-Trent,
19th January, 1877.

Messrs. HAYWARD TYLER and Co.

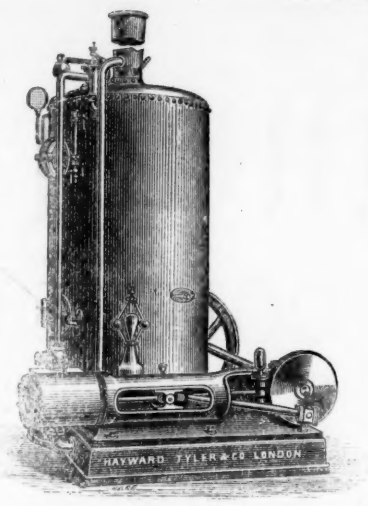
GENTLEMEN,

In reply to yours of the 15th inst., asking for some particulars as to the working of your pumps, I have much pleasure in saying that the two 21 inch by 10 inch work exceedingly well; they are attached to twenty 3 inch tube wells, which are 24 feet deep and 25 feet apart, at an average length of suction of 500 feet, and deliver the water into a tank 120 feet high.

We have also one of your 9 inch by 6 inch pumps fixed in an open well, which at times is 3 feet under water, and which after standing two days is started with little trouble by taking the precaution to close the steam cocks before the water rises to them.

I am, Gentlemen, yours truly,

WILLIAM CANNING.




HORIZONTAL ENGINE ON VERTICAL BOILER.

TESTIMONIAL, RE ENGINE.

40, Aldersgate-street, London,
January 8th, 1878.

Messrs. HAYWARD TYLER and Co.

GENTLEMEN,

Your engine, fitted with Rider's patent automatic expansion gear, has been at work in our laboratory for nearly 12 months. It runs regularly and smoothly, and but slightly increases its speed if one-third of the work be taken off suddenly. We have undoubtedly effected a considerable saving of coal (about 20 per cent.) since we have had your new engine at work.

(Signed),
HERRINGS AND CO.

TESTIMONIAL.

RE ½-H.P. HOT-AIR ENGINE—PUMPING.

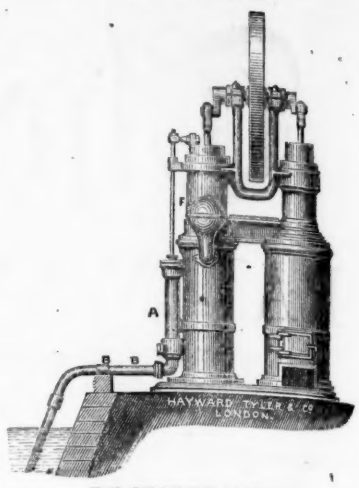
Messrs. HAYWARD TYLER and Co., London.

Royal Baths, Southend, March 14th, 1877.

DEAR SIRS,—I am very glad to inform you that the Rider Patent Hot Air Engine, supplied by you for pumping salt water for the warm baths, does its work remarkably well. The working of it is very simple, and consumption of fuel very small

Yours, &c., &c., T. W. INGRAM.

HOT AIR ENGINE




FOR PUMPING PURPOSES.

## 84, 85, WHITECROSS STREET, LONDON.

# MAY & MOUNTAIN, BIRMINGHAM,

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SOLE MANUFACTURERS OF

## TORKINGTON & HEYS'

# PATENT LUBRICATOR

FOR

## OIL, TALLOW, OR OTHER LUBRICANT.

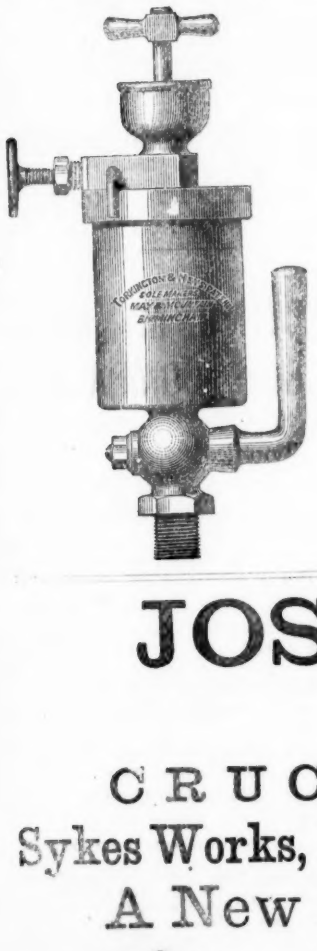
Entirely Self-acting.

The Flow of Grease, being regulated by the Steam, is constant, varying with the amount of Steam used.

No Waste.

Perfect Lubrication.

Greatest possible Economy.




| No. | Size. Inches. | Horse-power. | Price. |
|---|---|---|---|
| 00 | 1⅛ | Agricultural Engines... 5 to 7 | 8s. 6d. |
| 0 | 1⅜ | | 10 6 |
| 1 | 2 | | 14 6 |
| 2 | 2½ | 7 10 | 17 6 |
| 3 | 3 | 10 20 | 27 6 |
| 4 | 3½ | 20 30 | 37 6 |
| 5 | 4½ | 30 50 | 47 6 |
| 6 | 5 | 50 70 | 60 0 |
| 7 | 6 | 70 100 | 90 0 |
| 8 | 7 | 100 200 | 105 0 |

# COLEBROOK'S Patent STEAM PUMPS,

THE MOST RELIABLE AND ECONOMICAL

DIRECT-ACTING PUMPS.

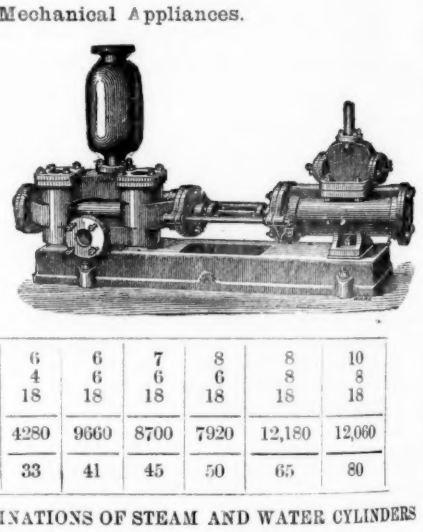
Short Pistons and Long Strokes.

The lide Valve is worked by the Exhaust Steam alone.

No Tappets, Valves, Levers, or other Mechanical Appliances.

All parts Simple and Easy of access.

Adapted for all purposes a d to all circumstances.



PRICES OF A FEW LEADING SIZES.

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Steam cylinder ...In. | 3 | 4 | 4 | 6 | 6 | 7 | 8 | 8 | 10 |
| Water ditto ...In. | 1½ | 2 | 4 | 4 | 6 | 6 | 6 | 8 | 8 |
| Stroke ..... | 12 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 |
| Gallons per hour..... | 720 | 1260 | 5040 | 4280 | 9660 | 8700 | 7920 | 12,180 | 12,060 |
| Price .....£ | 16 | 19 | 25 | 33 | 41 | 45 | 50 | 65 | 80 |

LARGER AND SMALLER SIZES IN ALL COMBINATIONS OF STEAM AND WATER CYLINDERS

DESCRIPTIVE PRICES ON APPLICATION.

# JOSEPH FENTON & SONS,

MANUFACTURERS OF

## CAST STEEL AND FILES,

AND

## CRUCIBLE CAST STEEL CASTINGS,

Sykes Works, Eyre-st. & Bridge-st., Sheffield. London Office: 118, Cannon-st., E.C.

# A New Patent Method of Fitting up Wheels and Axles.




FIG. 1 FIG. 1a



FIG. 2 FIG. 2a

Figs. 1 and 1a show a longitudinal view and plan of a pair of corf wheels and axles fitted up for outside bearings, and Figs. 2 and 2a for inside bearings. A A are the wheels; B, is the axle; C C, the washers; D D, the bolts; E, the collar on axle B; and F, the recessed boss in the wheel.

The wheel is cast with a recessed boss in the inside, made to any shape, corresponding in shape and depth with a collar formed on the axle, which is forged of solid steel; the axle is secured into the recess partly by being sufficiently tightly fitted to require driving home with a hammer, and partly by the washer. Around the axle adjoining the boss is fixed the washer, made in two parts and dovetailed, so as to allow of being fixed after the collar has been forged on the axle. The washer is secured to the boss by bolts and nuts, both in outside and inside bearings; in the case of inside, by means of lugs cast on the boss, and the washer made of corresponding shape; the washer is made of crucible cast steel. The only tool required for fitting is an ordinary spanner for outside bearings, and a box spanner for inside bearings.

Now what are the advantages of this method? You secure a simple way of fitting—it can be done by anyone who has seen it—the only tool required being a spanner; the wheels can be detached from or secured to the axle in a few minutes. The next advantage is the perfect solidity attained, the wheel and axle practically becoming as one piece. The durability results from the toughness of the material, and the solidity secured in the fitting. Another thing is the wheels do not need to be put in the fire to detach them, as is the case in ordinary wheels. (N.B.—Our wheels cannot be injured by being heated and plunged into cold water, which would render other steel wheels perfectly brittle as glass.) Saving in fuel and wages is evident—no skilled labour being required to refit wheels in case of a strained axle. By adopting this system colliery owners may save hundreds of pounds sterling yearly.

## Original Correspondence.

### THE RATING OF MINES.

SIR,—The parties interested in this important question have been singularly unfortunate in their suggestions of principles for rating mines. Last year they suggested that all mines should be rated on the *average royalty paid in each Union*, but this proposition was so manifestly absurd that it was never seriously supported by any person who understood the law or principle of rating; this year a clause has been proposed which is impracticable in its application to mines where the shafts or adits and works are in one parish and the minerals are worked from other parishes, Unions, and counties. I send you a copy of a clause which I have suggested, and which, in my opinion, would place the rating of mines on an equitable basis.—*Sunderland, July* 17. THOS. FENWICK HEDLEY.

BASIS OF ASSESSMENT OF COAL AND OTHER MINES, EXCEPT TIN, LEAD, AND COPPER.

The annual values of the surface land, shafts or adits, buildings, engines, and fixed plant connected with the mines (except tin, lead, and copper) shall be estimated in the same manner as the annual values of surface lands and other similar rateable hereditaments, and the same deductions or allowances shall be made from the said annual values for repairs, insurances, and other expenses as are deducted and allowed for the repairs and insurances of other similar rateable hereditaments. The annual values of the minerals (except tin, lead, and copper) shall be estimated yearly on the saleable produce of the mines in the year ending December 31 immediately preceding the making of the assessment, and on the value of the minerals, such values to be calculated on the fair letting prices of the minerals at the time of making the assessment under the ordinary terms of mining leases in the Union where the same are worked, and the amounts so ascertained shall be the gross estimated rentals. And the rateable values of the said minerals for all rates made for the relief of the poor and other purposes legally chargeable thereon according to law shall be a sum equal to three-fourths of the said gross estimated rental, and the rateable value for all rates made or levied by the urban or rural sanitary authorities shall be a sum equal to one-fourth of the said gross estimated rental.

### CANADIAN MINING NOTES—No. IV.

SIR,—My last letter gave your readers some idea of the Frontenac Lead Mine, of the surrounding country, and of the peculiarities of that country. Turn we now to a country nearly 700 miles west, but in the same province—Ontario. The paper which I send (and which I should like you to file away, so that in ten years from now it will be seen what my predictions are; moreover, the paper will be more valuable than an old picture if five or six of us turn out to be Bonanza Mackays) will give you a pretty good idea of some of the mines on Lake Superior. No country in the world is richer than Canada; no country has been so ignored with regard to mining; and no country has such a future. Probably most, if not all, of your readers have heard of Silver Islet. On this small island, scarcely an acre in extent, a long time ago silver was discovered; but in the hands of the Montreal Mining Company it did not produce much. It was bought by Americans, and before long they had taken out nearly three million dollars worth of the ore. For the last two or three years the stock has gone down, and the knowing ones have bought; and now they are again in full blast, and taking out about $1600 a day.

About 100 miles east of Prince Arthur's Landing on Lake Superior two rivers flow into the Lake—the Pic and the Little Pic. Near the latter river the McKellans located a rich silver mine, and also a copper development was discovered. The silver location is partly opened, and the copper vein has been thoroughly traced The silver vein, called the Ambrose Silver Vein, is on the property, and yields silver at from $5 to $100 a ton. With the present mining facilities, and without more capital, the then owners considered it could not be worked satisfactorily. A year passed, and this summer, by the advertisement in the Ontario Gazette of June 8. I find application for a charter is to be made. In the words of the Gazette:—

1.—The proposed name of the company is "The Pic Copper Company of Lake Superior, Canada."

2.—The object for which for which the incorporation is sought is for the purpose of acquiring, opening up, developing and mining, smelting and manufacturing copper ore, silver, gold, and any other mineral that may be found on mining locations near Little Pic river, on the north shore of Lake Superior, to wit:—

| | |
|---|---|
| On mining location V. 52 ... ... ... ... ... ... | 91 acres |
| Mining location V. 49, V. 50, V. 51 ... ... ... ... | 480 " |
| Mining location K 120 ... ... ... ... ... ... ... | 80 " |
| In all... ... ... ... ... ... ... ... ... | 651 acres |

3.—The amount of the capital stock of the said company is to be $200,000.

4.—The number of shares is 20,000, of $10 each.

It is on location K that the rich copper mine has been discovered. This lode is exposed for about 200 ft. in one place, showing all along a rib of copper ore, with inclosed pieces of talcose slate, and a small quantity of quartz and magnetic iron pyrites. The rib varies in thickness from a few inches to 2½ ft., accompanied in general with a foot or two of lower grade ore. The 480 lbs. block of ore sent to Toronto (now in the Canadian Department of the Paris Exposition) was, from the depth of 10 ft., the deepest point reached. On either side of the exposure the vein disappears in a valley under the alluvium, but it will not be difficult to follow, as the rock does not appear to be deep. It intersects at a small angle the Huronian formation, which here consists of greenish-grey micaceous slates, bearing E.N.E. and W.S.W., with a dip nearly vertical. In the vicinity of the vein the country is traversed by intrusive dykes of Silurian trap, and coarse-grained hornblende rocks of the Huronian age. It is expected that the vein will prove unusually rich near the intersection of an immense drop dyke 400 to 500 ft. east of the said exposure. This mine is situated about 2½ miles from the harbour of Little Pic, and a road is built to it. Large vessels could take on a full cargo of ore and land it at the dock in Swansea, passing through the lakes and River St. Lawrence and crossing the Atlantic. The quality of the ore is very good, and I send you a copy of the sales at the Swansea Ticketing.

Probably no enterprise in the way of mining has fairer prospects, and it would seem more than probable that such men as Vivian and Co., or the Landore Copper Co., would buy up enough shares to control the company, and thus have on hand at their works such a quality of copper ore as to be able to compete with great success and clear large sums of money. When one considers the amount which must be underground in a vein open for 200 ft., and averaging through the whole extent of it from 6 in. to 2 ft., he is immediately impressed with the vast wealth of copper which Nature has laid up in store. The 5 tons sent to Swansea was merely quarried out of a hole about 10 ft. deep, and there is a great deal of the ore left now on the mouth of the hole. Any guest at the Paris Exposition can see the block of copper, and all mining men must be impressed with its richness.

The directors of the company are the Hon. William Cayley, Peter McKellar, John McKellar, R. M. Robertson, Alexander McNab, and Herbert C. Jones. The solicitor for the company is Herbert C. Jones, 39, Adelaide-street, Toronto.

A most curious specimen has come into my hands, and had I not seen it I should have been disposed to have doubted it altogether. It is a piece of sandstone impregnated with native silver. Whoever heard of finding silver in sandstone? Such a thing is against all the theories, and yet Nature has upset all the theories and presents a mine, a rich mine too, with silver in sandstone. This mine is on the south shore of Lake Superior, and although not yet worked it will be before long, as they are taking steps to develope it.

In the last *Mining Journal* I see a full description of the new method for combination-heating which has been so successful in Lockport—that is, heating a lot of houses by means of a common boiler. Steps have been taken in Toronto to organise a company for the same purpose, which is called the "Toronto Steam Combination Company." It is probable that if successful here the plan will be adopted in other cities. How would it do, I wonder, to sink a hole by means of a Diamond drill deep into the earth and use the heat of the earth instead of burning up coal and having boilers?

Account of sales of copper ore, *ex* Cornwall, received at Swansea from New York *via* Bristol, and sold through Messrs. Richardson and Co., April 3, 1877, for account and risk of the Little Pic Mining Company:—

| No. | Purchasers. | Gross weight. 21 c. cwt. | Loss. | Net weight. 21 c. cwt. | Produce. | £ | Price. s. | d. | £ | Amount. s. | d. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 36 | ...Landore Cop. Co. | 4 | 9... | 3*...4 | 6...10¼...6 | 18 | 0 | ...29 | 11 | 5† | |

* Moisture 5 drs. per lb.; draftage 3¼ lbs. per cwt.
† Add 6s. 8d. for 20 casks = 29/. 18s. 1d.

*Toronto, June* 28. BOURNONITE.

### THE VIRNEBERG MINE, ON THE RHINE.

SIR,—In the *Mining Journal* of June 29 is a paragraph grounded on the report of the manager of this mine, speaking in very strong, but not too strong, terms of the present position and future prospects of this property. On April 30 the Virneberg Mine sold at the ticketing in Swansea 53 tons of ore of 23 per cent. produce, 61 tons of 13 produce, and 17 tons of 15½ produce, the average produce of these foreign ores sold having been 7 and a fraction. These are remarkable facts and figures, and will tell with practical men and men of business far more forcibly than any report could do. Whilst on the subject of high produce in which at the sale abovementioned Virneberg distanced all competitors, let me add, that the price paid for fine copper on a given day was 65/. 4s. per ton at Swansea, or 12s. 2d. per unit. The price of fine copper on the same day at Redruth was 60/. 16s. 6d., or 13s. 1d. per unit, the difference being 4/. 7s. 6d. per ton of fine copper, or 11d. per unit. The reason is obvious; at Swansea the produce was 22½, at Redruth it was 7; therefore there would be but 4½ tons of Swansea ore to smelt to get 1 ton of copper, and nearly 14½ tons of Redruth ore to return 1 ton of copper. It costs about the same to smelt 1 ton of ore whatever may be the quantity of copper contained in it.

The high produce of the Virneberg ore, its purity as extracted from the earth, and consequent low price of dressing the ore for market, are very important features in the future prospects of this mine. Note also that the handling, transport, and shipping charges are all decreased in the proportion of 3, or more, to 1; thus the quantity of fine copper which would cost in ordinary ore to transport 20s., would in this high produce ore cost only 6s. 8d., or even less. Then there is a freehold property subject to a royalty of 1-50th, or 2 per cent., payable to the Crown of Prussia; all apprehension of being compelled to pay a heavy fine on the expiration of a lease, as was the case in the Devon Great Consols, is thus removed.

The deepest level in this formerly the richest copper mine in Germany is only 70 fms., or 140 meters, under adit. At no point was it richer than at present, and extended working is only wanted to make its future more glorious than its past history, when the Duke of Nassau annually feasted all comers on his taking up, as he usually did, the dues of this mine, then 1-10th, now happily 1-50th.

On June 29, I am informed, 2800 cwts. of copper ore of not lower produce than the last parcel were shipped for Swansea, and already many tons of high produce ore are ready, and more in preparation, for the market. This mine is beginning to show the results of the expenditure of late bestowed upon it, and when the new dressing machinery and 20 to 25-horse power propelling engine are in operation—the site for which and the arrangements being all selected and made with a view to the saving of manual labour—and the levels are extended, this mine will be an established dividend-paying property. The ore being raised from the 90, 120, and 140 meter levels south from Hadley's shaft is remarkable; the lode appears to produce for many fathoms solid ore a foot wide, of course not free from some spar, but what will be understood by a miner as a solid course of ore a foot wide, a very large proportion being over 25 per cent. produce.

The progress made since my last visit has been very satisfactory, the energy displayed in the management great. I close this with the statement that I have not a share in the company, "worse luck," and with the intimation that within a very short time I propose to send a further notice more affecting the present working.

*July* 10. AN OLD CORRESPONDENT.

### COPPER SMELTING IN CALIFORNIA.

SIR,—A plea for greater effort in this industry on the Pacific Coast has been made in a communication to the New York Mining Record by Mr. Henry Sewell, M.E., who is a new arrival in San Francisco.

In taking issue with the author, who has evidently not a very high opinion of our metallurgists, I will draw from my own experience what may be at present of interest on the subject. During a period of over 27 years, in which I have been engaged in mining in this country and abroad, the reduction of ore has been, among other branches of metallurgical science, one of my specialities, and, for the sake of an exchange of opinion, I quote the following from the author's communication. Mr. Sewell says—"I am surprised to find that so little progress has been made on the Pacific Coast in this most important branch of mining. In 1872 I visited Calaveras County and the mines about Copperopolis, and saw there all the elements necessary for carrying on successful operations, both as to mining and smelting; at the same time I did not find that the requisite practical experience existed in all the branches of this business. The mines certainly were well worked, according to general practical experience, and one of the most important departments in the reduction of copper ores had been attempted—the mechanical concentration of ores of a higher percentage. But this operation had not been planted according to the most approved systems. Especially I noticed an absence of automatic contrivances, so important in carrying on this operation in an economical manner. The next defect that struck me was the absence of furnaces, which, according to long experience in Chili, is considered the corner-stone of success in the copper business. In fact, to this day not one furnace exists in Calaveras County. I know one mine there producing daily at present 15 to 20 tons of copper ore, averaging 18 per cent. and 20 ozs. in silver, and $7 in gold per ton, which is actually brought down to San Francisco for shipment to England, thus paying daily freight on 15 tons, which, being smelted into regulus on the spot, and with firewood, could economise 12 tons a day in freight alone. They are not paid for the silver or the gold. By smelting this ore they could raise it to 70 per cent. in copper and 100 ozs. in silver, of which 80 ozs. would be paid for, 20 ozs. being deducted in England for expenses of separation, and then the gold would likewise be concentrated to $35 per ton. The concentration of copper ores by mechanical means very seldom raises the percentage thereof over 22 per cent. The consequence is 4½ to 5 tons, instead of 1 ton, have to be freighted to San Francisco, and thence to Europe.

"The great profit of copper mining is made, first, by mechanical concentration to 15 or 20 per cent., and then smelting this ore at the mines to 75 per cent., whereby freight is economised on 4 tons. This operation is carried on in Chili in reverberatory furnaces with wood fuel, very often of a most inferior kind, the writer having had to smelt copper ores in some localities with a species of sage-brush which exists in the deserts of Northern Chili. The great advantage of this class of smelting is the small outlay in plant, not exceeding at most $1500, and with that amount the smelting of 15 to 20 tons of ore per day is carried out, being thus concentrated to about 4 tons of matte of 70 per cent.—a daily economy in freight of 15 tons. It has been found in Chili, the greatest copper-producing country in the world, that copper mining in itself is seldom remunerative, although there are exceptional cases. When copper in England was sold for 140/. a ton profits were made on ores of 20 per cent. shipped to England. However, those times are gone by, and for years past few shipments of ore have been made from Chili to that country, even when concentrated."

After dwelling at length on his experience in Chili the author arrives at the conclusion that copper smelting in California can only be made remunerative by adopting reverberatory furnaces for wood fuel. I draw from this that Mr. Sewell obtained his knowledge of metallurgy in England, where the reverberatory furnace is and has been almost the only method of smelting copper. It so happens that I have examined the most important smelting and other reduction works of England and the continent of Europe. To see one furnace in England is to see them all, and we must go to the other side of the channel to find science applied to the reduction of low-grade ores. The question why we ship ore to England for reduction is easily explained by the fact that coal can there be delivered at the works for 5s. or 6s. per ton. To produce a ton of fine copper from the ore requires in England 5 to 7 tons of coal, which would at the rate of $15 per ton, cost in California from $75 to $100, and our labour for smelting amounts to as many dollars as English smelters pay shillings. To reduce ore at a profit which contains only 0 75 per cent. copper is being done in the Hartz Mountains of Germany, without Mr. Sewell's reverberatory furnaces. There we can find economical reduction works, and study the science of metallurgy. If we had coal on this coast of the same quality and price we would certainly not ship another pound of ore to England. As regards smelting in reverberatory furnaces with wood or other inferior carboniferous fuel I can most decidedly state that this method has no special merits over others. It is a method of our great-grandfathers, with which Mexican miners are very familiar. Mr. Sewell says he is aware of the attempts which were made in California in 1865 and 1866 to smelt the very ore from which he proposes to obtain 70 per cent. regulus *in one smelting* from 20 per cent. ore. At that time Mr. Thos. Price erected at Antioch smelting-works, with reverberatory furnaces, for concentrating Copperopolis sulphuret ores, which proved to be a total failure, financially and otherwise. The coal of the Mount Diablo mines contains almost as much sulphur as the Copperopolis ore, from which Mr. Sewell imagines to obtain 70 per cent. regulus. The reverberatory furnace which Mr. Sewell brings to California from Chili as new and superior to all other methods of smelting copper was known to everyone familiar with metallurgical science long before this gentleman arrived in San Francisco, and especially to those of our capitalists who lost their money by it. J. MOSHEIMER,

Civil and Mining Engineer, Practical Chemist, and Metallurgist.

*San Francisco, California*, 507, *Montgomery-street, June* 27.

### RICHMOND MINING COMPANY.

SIR,—I beg to thank you for inserting my letter of July 4 in the Journal of July 6, and through you I tender my thanks to Mr. Bayliss for having given it such publicity. I quite concur with him in the wish that the two letters may be read together. I pass over the fact that many of the expressions in Mr. Bayliss's letter exceed the limit of moderation usually observed in debate, and that in replying to my letter, in which his own name, so far as I remember, is not once used, he has reiterated mine no less than 54 times; but for this repetition shareholders must have thought they were reading a chapter in the committee's report—the postulates, the challenges, the breathless periods, the broad allegations, and the vehement denials are so very similar that the two have clearly no dual origin, but are the unique production of Mr. John Bayliss. I notice that while he murmurs at the space which my letter occupies in your valuable Journal, he is quite forgetful that his own, in a smaller type, takes up a column more. And now I come to one or two matters to which, with your permission, I must reply. I am a friend of Mr. Probert's; "cherished and acknowledged" is a rhetorical extravagance of Mr. Bayliss's of which I do not see the application. I do hold a power of attorney to act for Mr. Probert in business matters during his absence. There is nothing very unusual in this, though Mr. Bayliss, by the use of the word "agent," would imply and insinuate something more. I am not, as the Committee of Investigation were pleased to emphasise in their report, related to Mr. Probert. I have stated so before in your columns, but surely, admitting all these combinations, Mr. Bayliss is both daring and illogical when he insinuates that Mr. Probert has kept me posted in the vicissitudes of the mine, or that he and I have used such knowledge for Stock Exchange purposes.

Does the selling of 175 shares in 1877 mean speculating in the shares of the company? If in possession of this supposed information, and a speculator, is it reasonable to suppose the operations would have been so limited? I sold those few shares at that time, so far as I remember, at the recommendation of my stockbroker, and for a purpose which would not interest Mr. Bayliss, and I had not then heard of the lawsuit. He must, however, know that I bought the shares back again pending the lawsuit, and before the decision was given, and this I had reason to regret, for they subsequently went down 50s. per share in value; as it was, I made very little by the transaction. To impute motives to two gentlemen, to hint that either would trifle with the honour of the other, is simply unworthy of the pen of Mr. John Bayliss. Mr. Probert has given me no information which he has not given to the shareholders generally; we hold each other in too much respect for the one to offer it or the other to ask for it. I make no idol of Mr. Probert: on the contrary, I have on occasions differed from him, and especially in regard to his criticisms of the board.

It was once insinuated by a close ally of the committee that I had been a large gainer by Richmonds; to be perfectly frank I have made but very little, and at one time was a considerable loser. The little success I have had is due to the confidence I have always felt in the management of Mr. Probert. Can all the members of the committee and their supporters make so clear a statement? And will Mr. Bayliss now act the heroic part he is prepared under the conditions he states to make to Mr. Probert, and withdraw his insinuations against me? I have treated Mr. Bayliss with personal respect, although our views differ in regard to the management of the Richmond Mine, and it is with regret I have seen that he has made himself the discordant "steam whistle" of the committee of investigation and its supporters, but he must not, though a partisan, lose his self respect, or he will lose mine. It is quite true that I said I would propose him for a seat at the board, but it was conditional that he would sever himself from all factions, and would act independently. I never said he would be elected unanimously; unanimity in the Richmond Company has become a scarce article. He declined stating it was his intention to sell all his shares and close his connection with the company so soon as the labours of the committee were ended. It was on the same occasion (I only remember one conversation with him) that we discussed the committee's nominees for the board, and though I referred to the fact that one of them lived, I think, in Derbyshire, he never mentioned to me then or at any other time that either of the four candidates named intended to withdraw, but I did infer this from our conversation that he was not very sweet upon Mr. Tendron. Moreover, Mr. Bayliss is a large shareholder, and divested of partisan influences would, I thought, be a not undesirable director.

Some years ago, it makes me hot to think of it, I was chased by a bull, and had to make for the nearest tree. In the security which it afforded I had the opportunity of calmly considering the situation, and well I remember how much I was impressed by the grand power and fierce determination of my misguided opponent, whose would-be seductive but very rough invitations to come down I naturally declined, till he got tired of waiting for me, and I thought if this power and determination could be more wisely directed and better applied how valuable it would be. Some such generous and forgiving feeling has ever since influenced me when I see power and determination only requiring a legitimate control and direction. The committee clearly are not a happy and united family. I will not, however, be dragged into the controversy between them and their colleague Mr. Pulbrook. So far as the facts are known to me as a shareholder, Mr. Pulbrook is a member of the committee, and also a member of the board, to which he was elected at the annual general meeting in August, 1877, and his seat has not been declared vacant. From the publication of an extract from a private letter, purporting to be written by Mr. Probert to Mr. Pulbrook, and quoted by Mr. Bayliss, it may be inferred, if, indeed, it was not already well known to be so, that Mr. Probert and Mr. Pulbrook are greatly changed in their feelings toward each other; in fact, are not, if, indeed, they ever were, friends. Nothing unusual in this. Are not the committee, too, now at variance with Mr. Pulbrook, and is there not a radical change in their sentiments towards him, and in his towards them? Then why blame Mr. Probert? The letter, moreover, is but the indirect expression of a wish that

Mr. Cuthbert (not Mr. Pulbrook) would join the board. I see nothing illogical or strained in the inferences and facts stated in my letter of the 4th inst. I cannot say as much for the letter written by Mr. Bayliss in reply, nor for his other letter commending the management of the Eureka Company, replied to by Mr. Hopkins.

In conclusion, will Mr. Bayliss inform me who is the author of or who inspired the article which recently appeared in Truth reflecting so unjustly on Mr. Probert? It is a simple question, that he may or may not be able to answer. Frankly, I do not impute the authorship to him, but he must see that I have a duty to perform from which, in spite of invectives, I will not shrink.

*Bolton Gardens, July* 18. —— J. P. BRIDGWATER.

## RICHMOND MINING COMPANY.

SIR,—Last week's Journal contained a circular addressed by the Chairmen of the Richmond Consolidated to the shareholders, in which I am charged with having made "inaccurate statements," and, further, with having made statements "incomplete, and, therefore, misleading." This being, to my mind, a serious charge to make in a public journal, unless well founded, I must ask, as a bare act of justice, that you will in your next issue give equal prominence to the enclosed reply to the Chairman's circular, so that your readers may be enabled to judge which of us can more properly be charged with having made "inaccurate statements." JOHN BAYLISS.

*Victoria-street, Westminster, July* 18.

## RICHMOND CONSOLIDATED MINING COMPANY.

TO THE SHAREHOLDERS,—I thought, in replying to Mr. J. P. Bridgwater and in securing the election of Colonel Steuart as a director, my work for the present would be at an end, but my friend Mr. Hopkins, the chairman, has, by his circular of the 10th instant, abandoned his position as a "benevolent neutral" (for which his good nature so well qualifies him), and has assumed the more energetic role of "a fighting gladiator." In that belligerent character, and in defence of his colleagues, he attempts a terrific onslaught on me—one of his best friends and most staunch supporters! It is quite refreshing to see this manifestation of latent energy, which, if wisely directed in the future, will be of immense advantage to the company, and I will not discourage him from the further exercise of his controversial powers by treating with discourteous and suggestive silence his sportive circular, in which my name figures so conspicuously.

My reply will be of the most friendly character, prompted only by the playfulness of spirit which induces one in all good nature to show a friendly opponent that, although Quixotic, it is not wise to attempt (especially in print) to refute facts by false theories, or endeavour to disprove the logic of correct figures by erroneous calculations. This Mr. Hopkins has attempted; he has sent his "Boomerang" flying at my figure-head as a target; it has missed the mark, and returns to strike his own. Mr. Hopkins expresses "surprise and regret," that "after agreeing to a resolution, acceptable to all parties, which was to place us all in accord, Mr. Bayliss should issue a circular the day after the meeting, the object of which is undoubtedly to disparage the management in the estimation of the shareholders." His surprise surprises me, and should vanish when I remind him that it was also agreed, "in order to place us all in accord," that Mr. Bower should not offer himself for re-election, and "the large majority of the shareholders present," knowing this as they now do for the first time, will appreciate the difference between the promise and the performance at the meeting. The effect of that upon my mind was such as to induce me to say, in all sincerity, "it is now necessary and imperative that shareholders should be enabled to judge of the waste and extravagance which is the distinguishing feature of the past and present administration of the Richmond Company;" and, on reflection, I cannot share in our Chairman's "regret" that I did give shareholders the facts and figures enabling them to judge of it. Mr. Hopkins says his challenge did not "refer to the question of management, but referred exclusively to the question of the alleged excessive consumption of fuel." What is that but a question of management? and a very important part of it too, seeing that it has lost us 168,000*l.* in the past two years. I certainly did not limit myself to the "fuel" part of the management, but took a comprehensive and all-round view of it, on the principle that it is useless making "two bites at one cherry." It appears in some respects I have given too much and in others too little information to satisfy Mr. Hopkins, for he says my "statement is incomplete, and, therefore, misleading." I compiled the comparative statement from the "published accounts of the respective companies," and up to the latest date as published by both. Beyond that date there does not as yet exist on all the items the means of comparison, but up to the date given the comparisons are truly and correctly set forth. I would ask Mr. Hopkins, or any actuary, what is the risk of "future possible liabilities" to shareholders of the Eureka Company, which has returned in dividends 25 times the amount of its whole paid-up capital, or on an average has repaid it once a quarter, or four times a year, ever since its formation? And, I would ask, have not the Richmond shareholders "future possible liabilities," in the shape of law suits, increased capital, loans in the shape of debentures, and, unless the management be altered, a possible reduction of dividends, or, as we have had in periods of the past, no dividends at all? And, further, for want of a reserve fund and working capital, and no unpaid share capital to fall back upon, to have the mine again placed in jeopardy, and not worth 24 hours' purchase, as the minute book shows has been the case; and shows also, and I say it to Mr. Hapkins' credit, that on that occasion he was one who stepped forward and advanced 1000*l.*, without security, to assist in rescuing the mine.

I want to avoid a recurrence of such "future possible liabilities" by reforming the management, hence my sowing the seeds of comparison between the two companies, which will fructify, and produce a future harvest of success if shareholders will only be wise in time, and aid willing hands to reap it. Mr. Hopkins says he is "unable to explain how, with so small a sum paid up, the Eureka Company have obtained their property," and if he takes as a model of prudent management the Richmond Company, "the capital of which is all paid up, and has been expended in purchasing and securing the mines or properties belonging to the company," I can well believe he is unable to explain or understand the more economical and judicious arrangements of the Eureka Company, but I can enlighten him even upon this point, and the explanation is charming from its extreme simplicity. The Eureka "obtained their property" with such limited funds by not giving for it more than it was worth, and giving possibly a great deal less. The Richmond Company, on the other hand, obtained theirs by giving 200,000*l.* for a property which was sold a few weeks before for 50,000*l.* or 60,000*l.*, and the first vendor says he would have taken 40,000*l.* for it if he could not have got more! Neither Mr. Hopkins, Mr. Broughton, nor Mr. Schultz were "first directors" of the Richmond Company, and therefore they are not in any way responsible for this first false move and great mistake, but Mr. John Elliott and Mr. Edward Bower were first directors, and doubtless, when the time arrives for shareholders to seek information on this point, those gentlemen will be able to afford some interesting particulars as to how the Richmond Company "have obtained their property," and all the circumstances connected with the purchase. Mr. Hopkins says "the capital of the company having thus been exhausted" by purchase of properties and lawsuits, they have paid out of revenue for improvements in six years 83,000*l.*, which otherwise would have been available for dividend (!), and further, they have been compelled to pay heavy "interest for the advances necessary to enable them to carry on so large a business," and if to the amount of dividends paid this amount of 83,000*l.* be added it would make up "as nearly as possible the "whole amount of the capital" repaid to shareholders "between August, 1871, and August, 1877."

Marvellous result! Prodigious!! Is this one of the instances in which Mr. Hopkins considers my "statement is incomplete, and, therefore, misleading?" If so, my answer is "we cannot eat our cake and have it too;" and, therefore, having "eaten" up our 83,000*l.* in the shape of improvements, we cannot now have it again in the shape of dividends, as we are invited to do by a stretch of the imagination. I for one cannot consider that dividends are paid to me unless I receive them in cash, or something convertible into coin of the realm. Further, if the 83,000*l.* be referred to as showing a favourable comparison with the Eureka, I will make the comparison complete and fair, which Mr. Hopkins has not done, by stating the fact that the Eureka Company have spent 69,000*l.* out of revenue in improvements; and not having a refinery (which cost us 20,000*l.*, out of the 83,000*l.*) it follows that a fair comparison will show the Eureka Company have spent 6000*l.* more than the Richmond out of their earnings on capital account for improvements, and by good management have avoided paying such heavy interest for advances to carry on a business as large as the Richmond.

In comparing the dividends paid for nine months from August 31, 1877, to May 31, 1878, I could only deal with facts and the amount actually paid. Every Richmond shareholder was aware that in cash and unrealised bullion and lead it was estimated that 139,000*l.* would sooner or later be available for dividends, but it is not consistent with my notions of a correct statement of facts to treat a sum of 139,000*l.*, the greater part of which may not reach the pockets of shareholders for months, as having been paid to them up to May 31 last (!), and if I had availed myself of such an elastic financial theory it would have involved the necessity in making the comparison between the two companies of stating also the estimated value of Eureka bullion, &c., unrealised on May 31, of which I have not any published statement, and besides this they too must have been credited with their undivided cash balance in hand. The Chairman in effect says if to the dividends actually paid to May 31, 1878, we add 139,000*l.* not paid, and if to that again we add 83,000*l.* taken from the revenue for purposes of capital, it will be found that a total of 9*l.* 16s. 3d. per share has been "earned," as against 10*l.* paid by the Eureka Company; these two ifs involve only 222,000*l.*! Mr. Hopkins, is not this a misleading comparison? Richmond "earned" only, against Eureka, not only "earned" but paid. Give the Richmond shareholders these 222,000*l.* in the shape of dividends, with interest from May 31 last, and then I will admit the truth of your statement that the Richmond shareholders have earned 9*l.* 16s. 3d. per share, as against 10*l.* per share already paid to the Eureka shareholders. Fortunately there is no sentiment in figures, and when correctly dealt with no desire to help a friend can make twice 2 equal to 5; and, therefore, I am bound to deal rigidly with facts and figures as they are, and in this matter I cannot assist Mr. Hopkins. But having stated the facts I will now give him the benefit of assuming his erroneous figures and theories correct, and what do they amount to? Certainly there does not appear much difference between 9*l.* 16s. 3d. per share and 10*l.* per share, but in the comparison with Eureka the difference is that in six to seven years the Eureka 10*l.* means that they have repaid to their shareholders the full amount of their paid up capital twenty-five times over, and the Richmond in the same period have repaid their capital but twice only.

Is this a result, even had it been obtained, which is not the case, of which the Richmond directors can be proud, or for which shareholders can be expected to be grateful? I think not. Mr. Hopkins says that "Although the two companies are working side by side under similar conditions, and have ores of the same character, unless the ores be of the same value, any comparison of profits is practically worthless, and does not prove the management to be either good or bad." Is not this again misleading, for Mr. Hopkins in his speech on June 18 said the Eureka "Have ores of the same sort; in fact, we are working under exactly similar circumstances;" and I do not see how the circumstances can be "exactly similar" unless "the ores are of the same value." However, I will deal with the comparison on the new ground taken up by Mr. Hopkins, and the ingenious distinction without a difference which he now makes between "ores of the same sort" and "ores of the same value;" and for the credit of the Richmond, he will learn with "surprise and regret," that even this comparison, as with all the others, reflects great discredit on the management. The ores have been in favour of the Richmond, notwithstanding the Pott's chamber $40 ore.

The following are the facts, and I am happy to be able to complete my statement in this, as I am able in other respects every statement to which exception is taken:—"During the financial year 1877 the Richmond product of the ore is shown in the official statement issued to shareholders to be 4183 tons base bullion, valued according to Eureka assay at $1,505,887, which is $360, or 72*l.* per ton, but deducting 15 per cent. therefrom (as Mr. Hopkins says it is 10 or 15 per cent. too high) in order to arrive at the market value, it would still leave $306, or 61*l.* 4s. per ton. For the same year the Eureka product is shown in their official statement, issued to their shareholders, to be 4280 tons of base bullion, valued at $1,198,698, which is $280, or 56*l.* per ton, and which clearly shows that the product of the Richmond ore was in value 5*l.* 4s. more per ton of base bullion than the Eureka. To my mind this clearly shows that the Eureka results of 1877 were due to "superior management," and not "to the quality of the ore;" and so far from attributing the payments by the Eureka Company of only 230,100*l.* in five years to waste and extravagance, I attribute it in some measure to their comparatively limited producing powers, to their extensive and judicious explorations, and not forgetting, as Mr. Hopkins does, that even the sum of 230,100*l.* to their shareholders means the repayment of their paid up capital more than ten times over in that period, I can only regret the Richmond have not done likewise. Mr Hopkins's figures as to "the average smelting cost of the Richmond Company from August, 1876, to April, 1877," and also in next paragraph as to "the cost of fuel per ton of ore," are totally wrong, and the figures given by me are strictly correct, as I can prove from the books and records in the company's office to the satisfaction of any mining accountant, not excepting the company's, and not even excepting Mr. Hopkins, for it is clear that he, or rather I would say those who prepared for him these marvellous corrections of my figures, have merely taken the wrong divisor. That is all, but it makes all the difference!

As to smelting, the divisor should be 30,867 tons. Thus—119,741*l.* 10s. 9d.÷30,867=3*l.* 18s. per ton; but Mr. Hopkins takes 119,741*l.* 10s. 9d.÷34,207=3*l.* 9s. 7d. per ton, and if he will only check the figures with facts he must detect the error.* The same remarks are applicable to the "fuel" question, that erroneous and misleading correction also arising from a wrong divisor. The cost of smelting from April, 1877, to February, 1878, was 3*l.* 3s. 6d. per ton, and not 2*l.* 16s. 8d., as Mr. Hopkins erroneously states. In the next paragraph Mr. Hopkins says—"On these inaccurate statements Mr. Bayliss asks, is it "not time to effect some reform in the administration not only in Nevada, but also in this country?" With Mr. Hopkins's circular before me, and the knowledge that my figures and statements are not inaccurate, but strictly correct, I beg to repeat that enquiry more emphatically than ever. I have in my letter to Mr. Bridgwater dealt with the causes which appeared to justify Mr. Pulbrook's election last year, whatever may be thought of it now. Mr. Hopkins says that Mr. Pulbrook and Dr. Maybury were "elected at the instance of the committee," and I must, therefore, remind him that he was a member of the committee as well as a member of the board, and that as he did not object or demur in any way to the election of either, it may be assumed that he approved of both; and when I see covert attacks made upon Dr. Maybury I feel bound to say that, in my opinion, there is not a more honourable or painstaking member of the board, or one who has a greater desire to discharge efficiently the duties he has undertaken. Mr. Bower having withdrawn from the poll, I wish to avoid saying one word that can be painful or annoying to him, but it is due to shareholders who have entrusted me with their proxies, and to the many who have since written offering to come, if necessary, and vote in person for Colonel Steuart; and it is further due to Colonel Steuart to know that his election has not been dependent upon the announced resignation of Mr. Bower, and that had the election been seriously contested there is no doubt whatever that Colonel Steuart would have been returned by a large majority. I am surprised Mr. Hopkins should think it "manifestly unfair" to elect to the board a gentleman who is "a party to the report upon which independent and impartial consideration was desired." If being "a party to the report" is a disqualification for a seat at the board, then not only Colonel Steuart, but our Chairman and Dr. Maybury, are also disqualified; however, fortunately it is no disqualification, but a positive advantage to the shareholders, and I am sure, on reflection, the directors, one and all, will give impartial consideration to all matters of interest to the shareholders, and that neither party or personal feeling will influence their deliberations. I am really sorry that what I trust may be my last "parting shot" should have to be pointed at our Chairman; but he having charged me with making "inaccurate statements," and further with making statements "incomplete, and therefore misleading," I have merely endeavoured (in self-defence and in the most calm and friendly spirit) to show that he is utterly wrong, and that nothing he has written has just fled his strictures upon the veracity of the figures of—

*Victoria-street, Westminster, July* 18. JOHN BAYLISS.

* The facts are as follows:—Mr. Hopkins, instead of taking as his divisor the product of ore from the Richmond Mine, has added thereto not only flue dust but also the fluxing ores purchased: these ores being as much a necessity for the smelting operations as coke or charcoal, he might, with as much consistency, have added to his divisor the weight of the fuel; and, further, if he could take credit in his divisor for the weight of fluxing ores he ought certainly to add the cost of them of them to the amount of 119,741*l.* 10s. 9d. before making his division to arrive at the cost per ton of smelting.

## THE RICHMOND MINING COMPANY.

SIR,—I see it stated in Mr. Bayliss's letter in last week's Journal that Mr. Broughton, vice-chairman of the Richmond Mining Company, has 5*l.* 5s. given him by the board for travelling expenses every time he attends a board meeting, which during the space of 5½ years has not averaged once every four weeks. No denial has appeared to this statement. I wonder what advice was given them by their solicitor—Mr. Vallance—on this subject. I also wonder why Mr. Vallance did not bring to the notice of the shareholders the illegality of the proceedings of the board *re* Rozan contract. Is a solicitor's first duty to his board or to the shareholders? I should like to see a change of solicitors. The Articles of Association cannot possibly be strained to legalise the charge of travelling expenses for a director, nor until the *exposé* by the committee would a shareholder have thought it possible that a director would accept or that the board would grant a coadjutor for attending a board meeting anything beyond the specified remuneration, for, once admit such a principle, the expenses would be indefinite, and a director might claim his travelling expenses from the other end of the universe to attend a board meeting in London. In this case, fortunately for the shareholders, the director referred to has been very sparing in his attendances. AN INDIGNANT SHAREHOLDER.

## THE PORT PHILLIP COMPANY.

SIR,—Your excellent Scotch correspondent wonders why the Port Phillip shares are so low on the market. The reason is very simple, and not far to look for. The utter absence of any news relative to the state of the mines or information to be gained is, no doubt, the reason of the low price of shares. There is generally supposed to be some very heavy explorations going on, but how they are proceeding is only known to the directors, who take good care to keep it very close. Nothing is ever seen of this mine in the Journal but a statement of the profits or losses, not a word more. I sincerely hope that when the next meeting comes round some fresh blood will be put into the directory. We pay our directors handsome salaries, and we certainly are blameable for not having the best men.

—— A LARGE SHAREHOLDER.

## CYPRUS, PRESENT AND FUTURE.

SIR,—The agricultural aspect of this island would seem to be all that is desired in a new territorial acquisition; thus we learn that in Cyprus timber, wheat, barley, cotton, madder root, locust beans, tobacco, olives, beet root, carobs, hemp, and fruit are the staple vegetable products, while the grape, which yields the most unexceptionally pure and salubrious wine, to the extent of 1,246,000 gallons per annum, becomes a most important item in the existing revenue, which, with the aid of British enterprise and skill, ordinary culture, and the adaptation of modern improvements, may be considerably enhanced. Of course, an improved and more convenient anchorage, and one much nearer the coast, will be the first consideration of the English Government, as at present, for want of harbours, breakwaters, and quays, vessels lay at a distance, load and unload their cargoes very inconveniently, and are often much impeded in their operations by stress of weather. Besides vegetation in its most prolific form, animal, useful insect, and piscatorial life abounds, hence honey, wax, wool, and silk on the soil, and fish in excess in close proximity to the shore.

From the foregoing it will be gathered that our new dependency presents a promising field for active exploitation, labour, and capital; and doubtless after the Government have taken the necessary steps for the construction of a suitable harbour, the utmost amount of English activity and investment of capital will supersede Turkish supineness and poverty. Well-built houses will take the place of miserable hovels, hotels succeed the contracted and filthy places of temporary resort, good roads and railways—for the sleepers of the latter the island spontaneously affords an illimitable supply of excellent wood, and the rocks a superabundance of rich iron ore—will speedily supplant the wretched apologies for facilitating transit, whilst the industry and skill displayed by the British workmen will act as a stimulant to the exercise of similar qualities on the indolent natives, be they Turks, Greeks, Fellahs, or Arabs, for of these the present inhabitants consist in the proportions of 25,000 of the first-named, 60,000 of the second, the remainder to the total number of 90 000 of the two last mentioned.

But it is not upon these matters I would principally dwell. Important as they all are they may be said to sink into insignificance when contrasted with the indubitable mineral wealth of Cyprus. To begin, then, with the name of the island. There is in it a decided smack of what may be expected. The word originally signified copper or cupreous, and records exist which prove not only the existence of this metal on the island but that it was obtained here in very considerable quantities. Even now the workings of the ancients can be readily traced, whilst rich deposits of rejected debris are scattered about in the localities of the "old men's" workings. To the pioneers of the present generation, whose capital, skill, and enterprise will be expended in the act of resuscitation, an abundant harvest is in the immediate prospective. Reference to iron has already been made. Truly may the scriptural passage be here applied—"Whose stones are iron, and out of whose hills thou mayst dig brass" (copper). If not from Cyprus whence came the enormous statue of Colossus of Rhodes, one of the once accredited seven wonders of the world? Rhodes it must be borne in mind is one of the group of islands of which Cyprus constitutes an integral portion, and the statue itself was formed of bronze, and of such enormous dimensions and weight that after being prostrated by an earthquake required 900 camels to convey away its debris.

Argentiferous galena appears to exist in great abundance. This ore will doubtless become an article of considerable enquiry when British enterprise is directed to the mineral resources of Cyprus. Rumour represents the lead ore as exceedingly rich in silver, whilst its proximity to limestone, of which there exists a great abundance in the neighbouring island of Marmora, will render the process of extraction exceedingly facile. Indications of the presence of gold in even large quantities is afforded by the fact that the precious metal in large nuggets is daily washed down by the mountain streams. These constantly recurrent visits of auriferous nuggets fail, however, to excite either the cupidity or the energies of the natives. The source of their advent remains to be determined, and soon, very soon, it may be safely predicted Cyprean iron will provide the requisite tools to British workmen in their successful endeavours to reach the source of unexplored wealth.

One other feature relative to the mineral deposits of this interesting locality, and under the circumstances already pointed out one of really primary importance, is the well accredited existence of coal, which for the simple reason already assigned—supineness on the part of the indigenous occupants of the soil—has hitherto remained unexplored. The importance of this feature is too paramount to require comment, I therefore bring my somewhat lengthy notice of this important and interesting territorial acquisition to a close—at least for the present—by merely remarking that I shall anxiously await the arrival of intelligence of the earliest pioneers.

*Laboratory and Assay Office, 3, West-street, Finsbury-circus, E.C.* W. WHITE.

## ROCK DRILLS.

SIR,—Some years ago it was my lot to be more or less indirectly connected with Mr. Crease, the inventor of numerous rock drills. Unfortunately for Mr. Crease's purse and mechanical talent he appeared at a time when the miner and the public did not concur in the feasibility of drilling shot holes by means of machinery. A few days ago my attention was called to a brochure by a Mr. Schram, and to my great surprise I found Mr. Schram claiming, without the slightest acknowledgment or reference, one of Crease's drills, barring a few accessory parts taken from other drills now before the public. The pistons, portways, passages in the cylinder, and mode of distributing the pressure fluid claimed by Schram was specified and illustrated by Crease on October 24, 1863. The turning gear in the Schram is that employed in half-a-dozen other different machines, the cradle and forwarding screw is taken from the Burleigh and Ingersoll machines. Of the much vaunted direct acting boring machine *now introduced* into England nothing, therefore, remains which can be attributed to or claimed by Mr. Schram. Of the brochure itself it may be sufficient to state that it runs foul of almost every drill now before the public. In smearing the Schram drill with praise Mr. Schram has unwittingly done a measure of justice to Mr. Crease—the Crease and not the Schram drill is the invention of a Cornishman. —— ALPHA.

## AUTOMATIC ORE DRESSING.

SIR,—Whilst mining is in its present depressed condition it is almost impossible to give too much attention to the utilising of every ounce of mineral, provided such utilisation can be effected at a profit. The value of the stone-breaker is now pretty widely recognised, probably because it is no longer pretended that it is a substitute for crushers or stamps, but really one of the most important auxiliaries. The present system of working mines permits of bringing even the poorest ore to surface, and the object of all should be to extract as quickly as possible all that it marketable, and get rid of the remainder. We require no attle heaps or halvans at surface, as if there be anything marketable it should be sent to market, and if there be anything worthless the ground should not be encumbered with it—the remedy for this state of things is the more extensive adoption of automatic ore-dressing; by which I mean not that manual labour should be dispensed with—there is no perfect substitute for the boys and girls at present employed—but the manual labour should be used where intelligence is required, and the machine where mechanical force is necessary.

Now, the use of the stone-breaker to reduce the ore to (say) 2-in. cubes will enable a given number of boys and girls to get through a larger quantity per day, and to effect the separation more perfectly. In the production of the cubes mentioned a certain proportion of small will be produced, which should be machine-treated separately. The sorting of the cubes (it will, of course, be understood that they are merely called cubes for convenience) should be into three classes, two of which should be separately crushed again in stone-breakers, set finer, and each class should then be carefully sized in trommels. This is a matter much neglected in England, although it has a material effect upon profits. Too many English captain dressers consider that this mode of dealing with the ore involves too much waste of time, but it does not. Indeed it is like the blast-furnace process of making wrought-iron—we may dispense with the blast-furnace, and make the wrought-iron direct; but, as Mr. Lowthian Bell demonstrates, the direct process is objectionable, because you handle the rubbish too much, whilst the blast-furnace gets rid of more than 95 per cent. of the impurities at once, and the remaining portion of the process is conducted upon pure or nearly pure metal, instead of upon metal and impurities combined. So it is with the apparently roundabout process described. The rejected cubes contain nothing worth troubling one's self about, and the remaining two classes are much reduced in bulk.

By this first and second treatment mentioned we shall have (say) six classes of mineral worth further attention, and these will, of course, be of varying degrees of richness; and the classification so far has been effected so cheaply that there is a better balance remaining for payment to the boys and girls for further separation. If it be lead ore the stuff as it leaves the trommels can be at once jigged by the usual machines, and by placing the jiggers rather more under the control of the attendants than usual I have seen lead, blende, and gangue separated to a perfection which, considering the character of ore under treatment, nine out of ten Cornishmen would have declared to be impossible without incurring loss by doing it. In the case I mention not only is the separation complete and profitable, but the entire dressing-floors have been laid out and are superintended by a Cornishman, who tried hard before leaving home to get his views adopted in Cornwall. The truth is, it looks slow and going over the same work twice; but it pays well, and that is the great matter, especially now. The cost per ton of ore treated is no less than usual—no fewer hands are employed, and none of those employed receive less wages; but the work is done more completely, and, consequently, the shareholders get better profits, even allowing for the interest on the first cost and maintenance of the machinery.

There is one other thing I would mention—the stuff thrown aside is really worthless, and, therefore, of no use to pile as halvans, as that in Cornwall it could be applied to a very useful purpose. There are disused and useless shafts at almost every mine, and there would

be very little cost in arching the bottom with (say) 12-in. masonry, and dropping upon this a couple of fathoms of hydraulic lime concrete—which, using 1 of lime to 10 of the refuse would not cost more than 2*l.* per square fathom, or (say) 10*l.* in all for putting in this bottom. I would guarantee that it would support all the stuff that could be piled upon it in a 200 fm. shaft; and the advantages would be that the refuse would be got rid of, the surface restored to its original condition, and, what is more important than all, the danger of unfenced disused shafts, and the cost of protecting them, would be removed for ever. Where there are several useless shafts the bottom could be put in such a depth—never less than 10 fms.—as might be necessary, and if the work be properly done it would be practically imperishable, and subsequent surface depression would be unknown.—*Westphalia, July* 2. CORNUBIENSIS.

## BLASTING WITH LITHOFRACTEUR.

TO THE EDITOR OF THE WEST BRITON.

SIR,—The paragraph in your issue of June 27 respecting the extraordinary blast at East Pool Mine having drawn forth a letter from Captain Bishop, in which he denies the correctness of the report, I beg to ask the favour of your kindly allowing me a little of your valuable space to give the public a detailed account of the experiment, the work performed according to measurement, and the cost incurred; and I think it will be easily seen that the statement was not so incorrect as Captain Bishop would try to make it. I contend the paragraph was correct. The hole was bored 6 ft. with a dip of 2 ft., so that it was then 5 ft. 8 in. from the face of the end, and blasted in the manner described, which brought out the rock for 1 ft. 6 in. in length, and 15 in. in diameter in the bottom of the hole, and for 14 in.; the hole was 6 in. wide and 9 in. high. From this point, which was 4 ft. from the face of the end, it brought out the rock from 6 in. to 7 ft. wide. Now, Captain Bishop stated it was utterly impossible for one hole to tear the rock, and said the hole would prove valueless, and would not pay for the explosives used. The report, however, of my son, and the person who assisted him, distinctly contradicted this, and convinced me the experiment was successful, and worth the trouble and expense incurred; and I thereupon asked the agents what they would give me to square the end, and, with generosity that I little expected, they offered me 10*l.* for what they previously gave 15*l.* I accepted their offer, and have since squared the end with a very satisfactory result, as the following figures, giving the exact cost, will show. Extent of hole bored 40 ft., cost as follows:—

| | | | |
|---|---|---|---|
| Two men, seven days, at 2s. 9d. ... ... ... | | £ 1 | 18 6 |
| Three men, three days, at 2s. 9d. ... ... ... | | 1 | 4 9 |
| 52 lbs. of lithofracteur ... ... £5 | 4 0 | | |
| Less 12½ per cent. ... ... ... 0 | 13 0= | 4 | 11 0 |
| Sharpening 98 borers at 1d. ... ... ... ... | | 0 | 8 2 |
| 8 lbs. of candles at 5d. ... ... ... ... ... | | 0 | 3 4 |
| Six coils of gutta percha fuse at 10d.... ... | | 0 | 5 0 |
| One hundred detonators ... ... ... ... | | 0 | 2 9 |
| Total ... ... ... ... ... ... ... | | £ 8 | 13 6 |
| Balance for superintending ... ... ... ... | | 1 | 6 6 |
| Total ... ... ... ... ... ... ... | | £10 | 0 0 |

The end was squared for 8 ft. wide, 7 ft. high, and 6 ft. in length, to the satisfaction of Capt. Bishop.

I quite agree with the remark that in times of depression agents and miners should be glad to accept any improvement that would tend to secure more work at less cost, but unfortunately in many cases the former think that any recommendation for improvement emanating from any person that is not exactly connected with them (the agents) is looked upon as an encroachment or an interference in their "vested interests." This perverseness must be eradicated from the minds of the agents and a better feeling inculcated before we shall be in a position to contend with the foreigner, and anything that will encourage the miner and get him to do more work at less cost should be eagerly accepted. It is a prevailing notion in this county that most of our best miners have gone to other countries, where they earn more money; but only a day or so since I was in company with one of the oldest and most respectable mine managers in this district, and the question was asked if he thought such was the case, which met with this reply—"Well, I recollect visiting America some years ago, and saw Cornishmen there getting 8*l.* per month at less per fathom than what they get at home." What does this say but that a better system is adopted abroad. We must give men more wages and get a great deal more work done in proportion before we shall succeed. I don't wish to interfere in the least with these who have the charge of our mines, and sincerely trust no prejudice will be shown because I aim at effecting a change in the mode of blasting for the purpose of doing more work at less cost.—*Camborne, July* 14. STEPHEN WILLIAMS.

## TREATMENT OF COPPER AND SILVER ORES.

SIR,—In the Journal of June 8 you published an article on my process for the treatment of copper and silver ores. It has only just been brought to my notice, and I find that the report is not quite correct, more especially as to the quantity of salt and acid used. I did not intend bringing my invention before the public until such time as the works now in course of erection were complete, so that at the same time as I published the news of this apparently improbable process I could have the satisfaction of saying to the incredulous—Go and see; but since you have honoured me with your notice I will, with your kind permission, proceed to give you a full description of the process, which you can publish either wholly or in part, as you may judge most convenient.

The whole affair rests on the fact that all kinds of copper and silver ores give up entirely these two metals in a solution containing a variable proportion of salt with a very small quantity of any strong acid, but it must be borne in mind that these quantities are not at all similar to those given in the *Mining Journal* of June 8. I refrain from stating any given proportion, because as this varies greatly according to the class of mineral, experiments carried on by persons imperfectly acquainted with the process might only lead to disappointment, but I may here say that I shall be most happy at all times to receive any sample of mineral (10 to 20 lbs.) for examination, and to which, on a small scale, I will apply my invention, returning the copper and silver produced, with full particulars as to the *modus operandi*. I need not add that I shall charge no fee for this, simply expecting the parties to pay all carriage. This seems to me to be the fairest test I can offer until such time as our works are in going order.

Malachite and non-sulphurous ores only require to be powdered before treatment, but for pyrites a slight preliminary roasting is necessary, not with a view of removing the sulphur, but to split up the mineral and render it entirely attackable by the saline solutions. The powder thus prepared is treated with the salt solution, agitated or percolated, and in a few hours time the whole of the copper and silver is extracted in the cold, no heat being necessary. In the strained solution the silver is first precipitated in the pure metallic state by a sheet of copper, and when the whole of the silver has been removed the copper is in its turn precipitated also in the pure metallic state by means of scrap iron. The pure spongy copper thus obtained can then be either run down into bars or pressed into that shape by means of a powerful press. The saline solution is then ready to treat another batch of ore, some 3 per cent. of sulphuric or other acid being the only necessary addition; and this is one of the most important points of the process, that the same liquor serves over and over again indefinitely, the trifling quantity of acid used each time being of little moment. In fact, the main expense consists in the powdering of the mineral, and in the case of pyrites the roasting is the next most important item, but I cannot too strongly dwell on the point that this roasting need only be most imperfect, any ordinary labourer can carry it on with quite sufficient skill for the purpose. The scrap iron used is about 75 per cent. of the copper produced, so that and the acid are mere trifles of the cost of working. The entire cost is so low that the poorest classes of minerals can be profitably worked. This is really the problem I specially endeavoured to solve, and I think I may say successfully, for even ores containing only 1 per cent. of copper yield the whole of the metal present without any waste. For certain silver ores, such as those containing arsenic and antimony, the process is invaluable, as it allows of the rapid production of the silver in the pure state, a thing almost unattainable by any means with this class of mineral.

In conclusion, I will only add that orders have this month been sent to Bolivia to work mineral according to my system; that in many other parts works are about to be started, and that in the Exhibition is to be seen copper obtained by my process. This must not be considered mere laboratory experiment; I have been four years studying the matter thoroughly, have operated on tons of mineral at a time, and when convinced of its easy and complete practicability, in partnership with Mr. De Baxeres, patented the invention in twenty-two leading countries. A. DROUIN,

33, *Rue Beaubourg, Paris, July* 11. Ingenieur Chimiste.

## NEW MOTOR—THE BRADLEY PROMETHOR.

SIR,—An excursion to the Capes of the Delaware is about to be made with a view to afford an opportunity for a public inspection and trial of a vessel fitted with a new motor, invented by the Rev. Robert D. Bradley, of Maryland, and which the capitalists who have supplied the funds have facetiously called the Bradley Promethor, because, as they say, it "promethes" so much more than it is likely ta perform, though they will be well contented if half those promises be fulfilled. The reverend gentleman describes the new power in the purely apolyptical style, with which he is so well acquainted, as "an undefined vaporous decomposition, produced by the action of water in contact with dry heat, the water in the operation being perfectly decomposed, and effecting a chemical phenomenon difficult of designation. The heating apparatus is enclosed in an air-tight chamber, the smoke being returned and consumed. There is consequently no discharge of smoke or cinders. Locomotives will no longer discharge their offensive burdens in the eyes, and ears, and laps of travellers, nor the escape of the steam-boiler drown the voice of conversation. A machine of 100-horse power does not occupy a greater space than 6 ft. square, and as many in height, and thrice that room will suffice for a machine of the power of 3000 horses, and so on to any requirement whatever. While there is scarcely any limit to the power of this king of forces, it is so disposed as to be perfectly harmless in the use. There can be no rupture further than the possible cracking of one or more of the generators, which are of very small size, and nearly independent of each other." Mr. Bradley has purposely ruptured them under a pressure of many thousand pounds, but there is no flying off, and they are so constructed as to be removable at will.

An engineer who has had charge of the engine states that he considers it the safest, most economical, and powerful force in existence, and has no hesitation in stating that it will eventually supersede steam in all departments of mechanical labour. The comparative consumption of fuel to produce the same amount of force may be estimated generally at less than one-fourth of that required by steam-power. The saving cannot be stated with entire exactness until proved by use, but the consumption cannot exceed in bulk a fourth of that required by the steam-engine; and the cost of the Promethor as an engine is in still less proportion, there being no bulky boilers, smoke-stacks, or other heavy adjuncts. This inventor does not believe that any useful power can be developed from any natural element without external aid or heat in some form, and thinks that he has economised that important element so that no machine can be simplified below the standard he has obtained in the consumption of fuel. Mr. L Montgomery Bond, the Vice-President of the Bradley Promethor Company, states that the machine and its capacities are not simply a great invention; they are an inspiration, utilising the forces of nature by the principles of natural laws, and conforming to the conceptions of man the prefections of the Divine intelligence in His works. PROGRESS.

*New York, June* 30.

## THE LONDON COAL SUPPLY VIA BOSTON.

SIR,—Not to trespass too greatly upon your valuable space permit me to refer to my correspondence in the Journal of Jan. 26, Feb. 2, March 9, 16, and 23, and April 16, 13, 20, and 27, and to state that not the least important feature of amelioration is the working the traffic at a greatly reduced speed—say a moiety. The Statistical Congress, at St. Petersburg, in August, 1872, states—"It is notorious that heavy traffic can be worked to the greatest advantage at low speeds." At a meeting of the Institution of Civil Engineers, on Feb. 27, 1855, Mr. Robert Stephenson stated—"Great speed at sea could only be obtained at considerable expense, it being almost immaterial whether coal was conveyed at 4, 8, or 10 miles an hour, regularity of supply being the most important question." Mr. Bidder "considered the ordinary screw collier speed absurd, five knots being the most economical." Mr. Brassey's pamphlet on "Unarmoured Ships" shows that an increase of speed of 1½ knot an hour in the cases of the Achilles, Bellerophon, Hercules, and Monarch involved an additional expenditure of fuel to the extent of 47½ per cent. A report of the New York Chamber of Commerce, Feb. 25, 1875, presents the most palpable case of combined lake, canal, and fluvial navigation, by far outstripping in cheapness of transit five parallel fiercely competing railways.

On the Erie Canal, United States of America, possessing a much larger traffic than all the French canals—France having the most extensive network of canals in Europe—the speed is 3·51 miles to 4·67 miles an hour, at which speed the Erie Canal (*vide* Report of the State Comptroller of the United States, January, 1875, and the (London) Economist, June 29, 1878), is enabled to convey wheat at a through rate from Chicago to New York at 8 cents per bushel, against 12 cents per rail equivalent after deduction of canal dues, in order to realise a comparison with marine transit, to 5½ cents, or 7s. 8d., per ton per canal, against 17s. 3d. per rail, or only 44 to 45 per cent of rail rate. The distance from Chicago to Buffalo is 925 miles; lake navigation from Buffalo, where the Erie Canal joins Lake Erie, to the Hudson river, 350 miles; and by that river 150 miles to New York. When it is taken into consideration that grain is thus conveyed on a combined lake, canal, and fluvial navigation 1425 miles in extent, the depth of the canal, originally 4 ft., since increased, with 72 locks, steamers of 200 tons cargo capacity laid up through ice during the winter, at 7s. 8d. per ton, not counting canal dues, in order to assimilate the conditions of canal and sea transit; further, that screw steamers are bringing grain from Cronstadt and the Black Sea to London, and from New York to Liverpool and Havre—distances of 1475 miles, 2812, 3150, and 3318 miles respectively—in isolated voyages, not, as in the Coal Trade, consecutive voyages at rates not merely bordering upon the precited Erie Canal tariff, but, according to the Shipping Gazette of July 11, quoting 1s. 3d. per quarter wheat Cronstadt to London much lower, what difficulty is there in an improved screw collier system absorbing the entirety of the coal traffic to London, on which head I am prepared to submit data of the very highest practical order.

The following tabular statement shows a saving of 5s. 10d. per ton effected by proposed undertaking over rail transport from South Yorkshire, 4s. 8d. from Notts and Derbyshire, and 4s. 4d. from the Tyne, thus:—

| BY RAIL, YORKSHIRE COAL PER TON. | | |
|---|---|---|
| Rail, 8s. 5d.; trucks, 9d.; lighterage, 1s. ..... | 10s. 2d. | |
| Bays, and loading from shoots ..... | 0 7½ | |
| Breakage, per Mr. Cockerell's evidence ..... | 1 7=12s. | 4½d. |
| From Notts and Derby, 1s 2d., less rail rate ..... | 11 | 2½ |
| Tyne, average freight, 5s 6d.; insurance, 1d.. | 5s 7d. | |
| City dues, 1s 1d.; lighterage, 1s; landing, 11½d. | 3 0½ | |
| Breakage, as per Mr. Cockerell's evidence ... | 2 4=10 11½ | |
| BY PROPOSED UNDERTAKING. | | |
| Freight, including rail, to along-side coal and gas wharves, above all, Metropolitan bridges, and insurance ..... | 3s. 11½d. | |
| Filling sacks, loading, discharging, and landing by own men in constant employment... | 1 6 | |
| City dues ..... | 1 1= 6 | 6½ |

These important results are obtained without inpinging return traffic, the entirety of such per rail and sea to Leeds, Manchester, &c., being assured by leading London wharfingers in this special trade. WILLIAM JOSEPH THOMPSON.

6, *Fitzwilliam-road, Clapham, July* 18.

## COLLIERY EXPLOSIONS.

SIR,—A great deal of discussion naturally follows the occurrence of a serious explosion, and the cause, it is often said, is never really discovered—"it is involved in mystery;" "the only persons likely to throw any light on the matter have perished." A defective lamp, the lighting of a match, &c., and other causes are suggested, and amid all this the primary cause of the explosion is apt to be overlooked. This is, no doubt, the accumulation of gas sufficient to cause such an explosion; that such an accumulation takes place is a fact quite patent, as without it the explosion is impossible. That such an accumulation takes place when the general arrangements are good is also both probable and possible, and it is also extremely probable that in most cases of serious explosion this is not caused by a sudden outburst such as a blower, but the air current has been gradually vitiated by the escape of gas from a goaf, or the air current has proved too weak in a particular division, and thus become charged to the point of explosion. A certificated manager may examine a mine to a certain extent without discovering this defect, and we are inclined to the opinion that the number of officers employed in many fiery mines is too small to allow of a proper system of daily inspection and supervision. It is hardly possible even to ascertain the general state of a large coal mine and all its divisions on any particular day or at any hour without the assistance of a staff sufficiently numerous and efficient. A few firemen and underlookers can scarcely accomplish this. In districts where the coal getter only works the coal—that is, gets it down and puts it into the tubs—a numerous staff of deputies is employed, and these men not only put up the timber and see to the laying of roads, but look after the ventilation and general safety of the district where they are placed. These deputies, while fully employed, and doing work which would otherwise be done by the hewers, only receive the pay which the hewers would receive, and they (the deputies) thus form a staff of the most useful kind, capable of looking after the ventilation in all its details, and they also direct the men and boys at the work, and keep order and discipline in the respective districts. Of course an overman is placed over these men, and he visits every part of the mine, and exercises control over all the workmen and officers. The general ventilation of the mine is entrusted to an officer also, and he has a sufficient number of men to keep open the airways and repair stoppings, &c. Under this system the manager has a chance of knowing the exact state of the mine in every part, and also of speedily providing a remedy for any defect discovered, and order and discipline can also be preserved. In a large mine where (say) 300 hands are employed, and only a few firemen and underlookers are employed, something like chaos must be the result. It is hardly possible to preserve order and attend properly to the safety of the mine under such circumstances.—*July* 17. VIEWER.

## MINING COMPANIES, AND THEIR PROSPECTS.

SIR,—In former times you had a very intelligent and useful correspondent, who styled himself "Argus." He expressed his opinion of mining schemes put forward, and of prospectuses issued, in a way to enlighten the inexperienced adventurer, and his letters appeared to do much good. We want, Sir, another "Argus"—someone who will boldly express his opinion on the terms and conditions upon which mining properties are placed before the public, and the prices at which the shares in them are quoted. Some very old mining districts have, during the last few years, come to the fore. I allude to Pateley Bridge, and that near Llanrwst. These mines have long been known, but not for their richness; and I cannot see that as yet any of the companies have done much to swell the Dividend List, nor to enlarge the ticketing paper sales. Perhaps they require more time, but "Argus" ought to watch and tell us. There is another affair, called the Cambrian Company, which was formed to work the old mines of Esgair Hir and Esgair Fraith, up in the wild mountains of Cardiganshire. Many companies have tried their hands at these mines, but no one ever heard of a profit being made, nor of much ore being sold from them. The promoters of this company are said to have bought up the leases, and brought out the present company with a capital of 100,000*l.*, taking a large slice of money and shares for themselves. Great expectations were raised in consequence of a report that vast quantities of copper ore had been discovered, and at Swansea hopes of a now large supply to that market were entertained. The agent at the mine has by no means confirmed this report, and the sales of copper ore given in your last week's number show that only 116 tons, fetching 1113*l.* 5s., were sold during the last twelve months. It may probably turn out to be a good mine, but it is sad to see such exaggerations put forward. WATCHMAN.

## REMINISCENCES—No. XI.

SIR,—The "last will and testament" of some persons evidences the absence of natural affection, and in others the presence of mental imbecility or eccentricity. The widow of the late Col. Willyams, of Truro (Mrs. Brydges Willyams), who died a few years ago, left all her estate, worth 45,000*l.*, to Mr. D'Israeli, now Lord Beaconsfield. Her late husband's relatives are the Messrs. Willyams, of Carnanton and Truro, who were not remembered in the will. Whether the property belonged to her by marriage settlement or not I cannot say.

A lady died at Penryn, about 20 years ago, leaving all her property, worth from 40,000*l.* to 50,000*l.*, to her physician. It is said that a relation—I think a nephew—was led by her to expect a provision out of the estate, but he was disappointed. A clerical gentleman, a very amiable man, a son of the physician, is now enjoying the property.

A miser died near the Lands-end about 30 years ago, leaving 70*l.* to a lady (my aunt), who lived in the same village. She said that she would not enjoy the savings of a miser; so she put it, with additions, towards the erection of a Wesleyan meeting house in the same village, where there was no place of worship before. It is used as such at the present time.

The largest devise to a stranger that I ever heard of was that made by the late Mr. Rd. Harvey, of Gwennap, who gave all his estate—said to be worth nearly half a million—to his solicitor, because he was a "civil" man. But the widow of Harvey has a life interest in all the landed estate, and is likely to outlive the devisee.

In speaking of the foundling child left at the door of Tullimaar House, and adopted by Mr. Sampson, I omited to say that she was surnamed Perran, after the name of the parish in which that house is situate. The people in the locality—or many of them—supposed that the cleanly "suicide" of whom I spoke in my last was the father of the infant. It is now too late to clear up doubts on that matter, all the parties concerned being, I think, in the spirit world.

A landowner in Cornwall, about 40 years ago, had a steward who had been in that position 20 or 30 years, but of whose honesty the lord was very suspicious. In order to test his principles the lord adopted a plan which confirmed his suspicions. Shortly after that a rent meeting was held, previously to which he went into the steward's office, and said "L——, have you any private papers here?" "Yes, sir." "Then take them out, and leave the office." The steward (no longer such) left the office, and the lord locked the door after him. At the rent dinner, soon after, the lord in his speech said "Gentlemen, I have to inform you that L—— is no longer my steward. They say that he is rich. Where his riches came from I cannot say, for he never had more than 50*l.* a year from me." He had his board and residence besides that salary; and his successor had, and still has I have been informed, 200*l.* per annum. If a man is under paid he is liable to a temptation to be dishonest; and the Roman Catholics teach—or taught—that if a servant thinks that his services are not sufficiently paid for he may take from his master to make it up! It has been said that ill-gotten money is seldom retained long by its possessor. In the case of this steward it so happened, for he did not live long to enjoy it;

and he bequeathed it to a man who became a drunkard, and squandered it all away in a very few years at Falmouth.

The late Mr. B Sampson, although an affable man, and somewhat humble in his manner and address, could not bear to hear any reference made to his humble origin. One day at a Quarter Sessions, or Assize, a witness was examined, who said that he came from Gwennap. "You from Gwennap, are you?" said Mr. Sampson, "I have no recollection of you." "I knew you, sir, very well when you was working as a carpenter at Tresavean Mine," said the man naturally, without intending to wound Mr. Sampson's feelings; but it was perceived by those present that they were mortified. The late Mr. Collan Harvey, of St. Day, was not ashamed to be called a cooper when he was the possessor of half a million sterling.

Provincial banks are sometimes short of bullion. One day a depositor at a bank in Cornwall wanted 1500*l.* to pay a man for a farm. The depositor drew a cheque, and when he presented it the cashier said "We have not got so much gold in the bank; but if you will take our cheque, and call at Mr. John Williams's bank at Redruth, we will pay your expences and the commission." That course was adopted, and the coin had. OBSERVER.

## SOUTH DE ERESBY MINE.

SIR,—The secretary of the South de Eresby Mine notices the latter part of my letter only, and expresses astonishment that I who consult the *Mining Journal* should be ignorant of the price of shares.

I asked for the *market* price—that is, the price the shares could be sold for in the market, as my broker had informed me "there was no price on the market."

Instead of a visit to the mine to judge for myself of its mineral wealth, as the secretary suggests, I am content to abide by the report of Mr. Jehu Hitchins, which I see on page 160. This gives me the impression that there are a certain number of promising lodes in the mine, the stratification is favourable for mineral, and, on the whole, as Mr. Hitchins concludes, I may "regard the property as *presenting a field* for mining operations of more than ordinary character."

But, Mr. Editor, in one of the circulars I complained of, and which I received from a stranger some months ago, calculations were entered into, based, it was said, on *mineral discovered*, telling me that the profits would be "hundreds of thousands of pounds," and upon this I was pressed to buy shares at 1*l.* each, of which there were 30,000 in all. Each succeeding month has brought me the usual crop of circulars described in my letter to you, always with fresh discoveries, and copies of telegrams denoting the splendid and improving character of the lode in the shaft.

Mr. Hitchins now tells us that this shaft is 3 to 4 fathoms—say, 24 ft. deep. The lode in it is 12 ft. wide, with four branches in it of solid lead, from *half an inch* to *one inch wide*, making the 12 feet worth 1¼ ton a fathom. If so the depth may, I suppose, have produced 6 tons of mineral to provide the magnificent profits promised me in the circular referred to.

The other parts of the property are described by Mr. Hitchins as "promising," and nothing more. Indeed, it is difficult to conceive anything more at variance with the statements in these circulars than Mr. Hitchins' report.

I do not impute blame to the secretary for this, he may be entirely ignorant of what I complain of, and will see that any speculation can only be brought into disrepute by such means.

A COUNTRYMAN.

## PANT-Y-MWYN (LEAD), FLINTSHIRE.

SIR,—On a previous occasion having had the pleasure of communicating through the Journal for information touching the above property, I again trouble you in order to bring before the notice of your readers its extraordinary merits. It is, indeed, the opinion of every practical miner who has visited the mine that it is one of the richest ever discovered in the Principality, not even excepting the celebrated Van and Minera. Of course, the returns have not yet come up to either of these mines, as they have not opened up sufficient ground; but the ore exists, and is practically inexhaustible. In this district the ore is found generally in "flats," but it is a "true vein" that traverses this sett, very regular and defined; the ore is found in some places solid 2 ft. wide, or say 9 tons to the fathom. One part of the lode is worth 10 tons per fathom, another 5 and 2 tons. The monthly returns are being rapidly increased, and the profits on the working of the mine are very large—sufficient, indeed, to enable the company to pay handsome dividends. It is believed that within another twelve months they will be able to return from 200 to 300 tons of ore monthly, which realises about 11*l.* 12*s.* per ton. The working expenses are under 230*l.* per month The undertaking affords a valuable opening to parties who desire a good safe investment, as not only will they receive substantial dividends, but before long will be able to make a large profit, owing to the increased value of the shares. INFORMANT.

[For remainder of Original Correspondence, see to-day's Journal.]

## GOLD AND SILVER MINING IN CANADA.

For some time past systematic explorations have been energetically carried on by the Gatling Gold and Silver Mining Company in their concessions at Marmora, in the county of Hastings, and province of Ontario; and it is considered that a point has now been reached when the application of a comparatively small amount of additional capital is all that is required to bring the enterprise into a highly profitable position. The mineral lands owned by the company embrace more than 400 acres, but attention appears to have been hitherto confined to one concession, of about 12½ acres in extent, and which appears to be of a very promising character. It embraces 505 ft. in length of the gold and silver veins, which run nearly north and south, and are traceable for over three miles. At this point they are four in number, running in a belt about 350 ft. wide from east to west. Ore from all these veins contain visible gold, and free gold can be panned from the surfaces of the veins, all along their outcrops. Shafts have been sunk on three of the veins, and the fourth has been well tested by openings. The ore which contains no visible gold has been assayed by the Messrs. Balbachs, of Newark, New Jersey, and the East vein has been found to yield—gold, $23·76; silver, $4·07=$27·83 per ton; whilst the West vein is still richer, yielding—gold, $25·62; silver, $4·39=$30·01 per ton. But the probability of profits can be best judged of from a larger parcel; and it appears that about 50 tons of ore taken from the different piles at the mouths of the shafts by independent persons was treated at their quartz mill in New Hampshire, and about $30 per ton extracted. The cost of working the ores by the process employed is estimated, with proper furnaces and other appliances, not to exceed $5 per ton, and of mining $2 per ton, or the total cost of mining and treating ores should not exceed $7 per ton, leaving a net profit of $23 per ton, or on a year's (250 days) work of a 20-stamp mill $115,000. In addition to this profit and that derived from arsenic saved in process of roasting, a considerable sum might be realised by the sale of sesqui-oxide of iron, or No. 1 fire-proof paint.

The Gatling ore is described as almost identical with the Clunes (Australian) ore, but much richer, and it has been treated by a similar process. At the Centennial Exhibition the Gatling ore received a medal and diploma; and Prof. Chapman, of Toronto, who has from time to time assayed the ores, states that he has never failed to obtain from any sample of the mispickel at least $50 per ton; and in his report he records assays which gave $73·50, $69·86, and $60·26 per ton. A considerable amount of time has been occupied in ascertaining the cheapest, simplest, and most effective process for extracting the gold from the ore, and the directors are now satisfied that the mode of treatment followed at Lisbon, N.H., is correct in principle, and with proper care will result in successfully extracting the gold at a very moderate expense. There is now on the surface at various shafts about 300 tons of ore ready for milling, estimated by Prof. Rickard to contain a net value of $69,000 in coin. The company have a 20-stamp mill nearly completed—the stamps, batteries, two vertical engines of 40-horse power each, and boiler are in position; also a large boarding-house for miners and workmen, an office for superintendent, good workshops and barn, and personal effects—all valued at $40,000. The various assays, tests, and working of the company's ores show an average richness most favourably comparing with that of the most profitable mines in Nevada, Utah, and Colorado; while the cost of mining and treating in Canada is barely one-half what it is in either of the districts named. After reporting upon the various points of operation, the buildings and machinery which have been erected, and other matters of detail, Prof. Chapman says that he may be permitted to express his opinion that, although the development of this mining property has necessarily occupied much time, it has been carried on, under the management of Mr. Gatling and Captain O'Neil, with great system and forethought. A moderate outlay of time and capital is now only required to bring it into completion, when very large returns from the mine will undoubtedly accrue. He has estimated that a sum of $50,000 will be sufficient to open up the lode for stoping, and to put the mill and general appointments of the mine into thorough working order. It is understood that it is proposed to raise the amount in the English market, and that a prospectus will shortly issued for that purpose, and of which due notice will be taken.

## THE PARIS INTERNATIONAL EXHIBITION.

No. X.

On inspecting the geological map of New South Wales it will be found that the principal coal field crops out on or near to the coast, extending along it from Burril to Port Hunter, a distance of 180 miles, without any material break in the whole distance. From Port Hunter it strikes inland to Stroud, a further distance of about 44 miles. From the outcrop at this place to the coast the distance is about 15 miles, and from the same point of outcroppings to Sugar Loaf Point Bay it is about 25 miles. For the whole distance named the outcroppings are nearly in a straight line. The general bearing of the field is in a northern and southern direction. The greatest width in an east and westerly direction is from Port Hunter, where it spreads out for over 100 miles in an apparent unbroken condition. Other minor coal fields exist in the Wellington and Blich, Liverpool Plains, and Cwydir pastoral districts, extending up to the Macintyre river. There are also other coal fields in the Clarence pastorial district and on the Richmore river.

We concluded our last notice with a copy of the vertical sections of the New South Wales upper coal measures, and we now continue them. No. 4 is a section showing the strata and seams of coal at Lithgow Valley, county of Cork, western district:—

| Feet | inches. | Description of soil. |
|---|---|---|
| 10 | 0 | Alluvial |
| 20 | 0 | Sandstone and shale [quality not proved. |
| 4 | 0 | Coal, about 3280 ft. over sea level; thickness and |
| 25 | 0 | Sandstone |
| 13 | 6 | Coal, with a number of clay bands [alluvial |
| 159 | 0 | Shales, sandstone, &c.; cannot be seen on account of |
| 1 | 0 | Coal to be seen cropping; not sufficient covering on |
| 7 | 6 | Shale and fire-clay [it |
| 5 | 6 | Fire-clay |
| 1 | 0 | Coal |
| 37 | 6 | Friable shale, with limestone bands |
| 32 | 4 | Sandstone and shale |
| 0 | 7 | Coal |
| 4 | 0 | Blue metal, full of vertebraria |
| 6 | 6 | Conglomerate |
| 1 | 2 | Coal |
| 8 | 0 | Blue metal, full of vertebraria [about |
| 10 | 0 | Grey sandstone and conglomerate, with coal pipes |
| 2 | 0 | Blue metal and shale |
| 0 | 7 | Coal |
| 0 | 4 | Band |
| 1 | 0 | Coal |
| 0 | 1 | Band |
| 0 | 10 | Coal |
| 0 | 1 | Band |
| 1 | 0 | Coal |
| 0 | 1 | Band |
| 2 | 2½ | Coal |
| 0 | 0½ | Band, ½ in. to nothing |
| 2 | 6 | Coal |
| 0 | 1 | Band |
| 1 | 8 | Coal |

A short distance below this a series of strata conglomerates, sandstones, shales, and grits, containing the fossil fauna of the lower carboniferous formation.

No. 5 shows the strata and seams of coal at Burrangorang, near the junction of the Burrangorang and Cox's river, in the county of Cork, western district, New South Wales.

| Feet | inches. | Description of soil. |
|---|---|---|
| 12 | 0 | Alluvial |
| 18 | 0 | Rock |
| 4 | 0 | Coal, not proved over 3 ft. |
| 53 | 0 | Conglomerate |
| 0 | 8 | Coal |
| 6 | 0 | Metal |
| 2 | 0 | Splint coal |
| 12 | 8 | Indurated clay, stone, &c. |
| 2 | 4 | Coal |
| 28 | 6 | Shale, with a little limestone |
| 2 | 8 | Coal |
| 1 | 0 | Indurated clay |
| 4 | 8 | Coal and bands |
| 3 | 0 | Indurated clay |
| 0 | 4 | Flintstone |
| 1 | 0 | Coal |
| 0 | 2 | Flintstone |
| 2 | 2 | Coal |
| 1 | 10 | Black stone |
| 2 | 0 | Coal |
| 0 | 2 | Band |
| 7 | 0 | Coal |
| 0 | 14 | Black stone |
| 0 | 4 | Coal |
| 2 | 0 | Fire clay, full of plant impressions |
| 17 | 9 | Conglomerate and shale |
| 0 | 8 | Bituminous shale |
| 1 | 0 | Fire-clay |

About 200 ft. below this a series of strata of sandstone, shales, grits, and conglomerates, containing fossil fauna of the lower carboniferous formation.

No. 6 is a section of the upper coal measures of the southern district, showing the strata and thick seam of coal on the Nattai river, near the Fitzoy Iron Mines, in the county of Camden.

| Feet | inches. | Description of soil. |
|---|---|---|
| | | Sandstone |
| 2 | 7 | Coal, fine-grained splint |
| 0 | 3 | Black bars |
| 0 | 3 | Coal |
| 1 | 4 | Sandstone |
| 5 | 6 | Splint coal |
| 0 | 2 | Black metal |
| 5 | 0 | Grey rock |
| 1 | 1 | Splint coal |
| 0 | 4½ | Coal and dirt |
| 2 | 2 | Splint coal |
| 0 | 2 | Coal and dirt |
| 4 | 6 | Splint coal |
| 0 | 0½ | Parting |
| 7 | 6 | Splint and bituminous looking coal |
| 0 | 3 | Stone |
| 1 | 3 | Coal |
| 0 | 2 | Coal and dirt |
| 3 | 6 | Coal |
| 0 | 0½ | Parting |
| 0 | 2 | Coal |
| 0 | 2 | Parting |
| 0 | 5 | Coal |
| 0 | 1 | Parting |
| 0 | 7 | Coal |
| 0 | 2 | Parting |
| 0 | 11 | Coal |
| 0 | 2 | Stone |
| 3 | 9 | Grey rock |
| 15 | 0 | Sandstone |
| 5 | 0 | Fine conglomerate |
| 0 | 9 | Grey conglomerate |
| 11 | 0 | Sandstone |
| 15 | 0 | Metal |
| 13 | 0 | Conglomerate |
| 18 | 0 | Indurated claystone |
| 80 | 0 | Green stone |

Immediately below this a series of strata of sandstones, grits, and conglomerates, which contain the fossil fauna of the lower carboniferous formation.

No. 7 is a section of the upper coal measures of the western district; section showing the strata and seams of coal at Kangaroo Creek, in the county of Camden:—

| Feet | inches. | Description of soil. |
|---|---|---|
| 10 | 0 | Alluvial |
| 20 | 0 | Rock |
| 3 | 0 | Shale |
| 4 | 0 | Coal |
| 3 | 0 | Rock |
| 4 | 0 | Coal and shale |
| 12 | 0 | Coal, with bands |
| 2 | 0 | Black metal, full of vertibraria and coal |
| 5 | 0 | Grey metal and fire-clay, with glossopteris and conglomerate |

A short distance below this a series of strata of conglomerates, sandstone, shale, and grits, containing the fossil fauna of the lower carboniferous formation, and underneath the latter is granite.

No. 8 is a section of the upper coal measures of the southern district, showing the strata and seams of coal at Mount Keira, near Wollongong, county of Camden, from actual measurement taken between the Osborne, Wallsend, and Mount Pleasant Coal Mines:—

| Feet | inches. | Description of soil. |
|---|---|---|
| 15 | 0 | Alluvial |
| 15 | 0 | Rocks |
| 7 | 0 | Coal |
| 4 | 0 | Fire-clay |
| 21 | 0 | Brown and grey sandstone |
| 4 | 0 | Coal |
| 32 | 0 | Blue metal and grey post |
| 2 | 0 | Bituminous shale, or inferior coal |
| 0 | 5 | Parting |
| 1 | 0 | Bituminous shale, or inferior coal |
| 0 | 3 | Parting |
| 0 | 11 | Bituminous shale, or inferior coal |
| 0 | 1 | Parting |
| 2 | 6 | Splint coal |
| 1 | 0 | Shale |
| 2 | 6 | Brown sandstone |
| 2 | 6 | Black metal |
| 2 | 10 | Coal, bright bituminous looking |
| 2 | 0 | Black and blue metal |
| 3 | 0 | Coal |
| 0 | 2 | Parting |
| 0 | 6 | Coal |
| 0 | 1½ | Parting |
| 0 | 9 | Coal |
| 0 | 2 | Blue metal |
| 2 | 4 | Coal |
| 0 | 3 | Grey metal |
| 0 | 2 | Coal |
| 0 | 1 | Parting |
| 1 | 9 | Coal |
| 0 | 4 | Black stone |
| 0 | 8 | Coal |
| 4 | 0 | Fire-clay, full of vertebraria, &c. |
| 12 | 0 | Grey sandstone |
| 10 | 6 | Brown and grey sandstone |
| 5 | 0 | Coal, shale, and stone |
| 25 | 8 | Metal, with glossopteris |
| 1 | 3 | Brown sandstone |
| 0 | 9 | Coal |
| 0 | 1 | Parting |
| 1 | 6 | Coal |
| 0 | 8 | Dark metal, full of glossopteris |
| 0 | 10 | Coal [and vegetable impressions |
| 11 | 6 | Grey shale, with ironstone bands, full of glossopteris |
| 1 | 2 | Brown sandstone |
| 0 | 6 | Friable grey shale |
| 10 | 0 | Fine grey sandstone, in thin layers, full of glossopteris and vegetable impressions |
| 1 | 2 | Brown sandstone |
| 0 | 6 | Friable grey shale |
| 10 | 0 | Fine grey sandstone, in thin layers, full of glossopteris and vegetable impressions |
| 0 | 5 | Ironstone [plants |
| 8 | 6 | Sandstone, with glossopteris and impressions of |
| 0 | 3 | Ironstone, very heavy |
| 9 | 0 | Metal, with glossopteris, north top part |
| 5 | 0 | Coal, &c., not properly proved |
| 1 | 6 | Band |
| 6 | 0 | Coal, &c., not properly proved |
| 25 | 0 | Shale and metal |
| 2 | 0 | Coal |
| 20 | 0 | Blue metal |
| 29 | 0 | Grey post |
| 30 | 0 | Hard rock |
| 38 | 0 | Brown sandstone |
| 40 | 0 | Grey post |
| 0 | 3 | Indurated clay |
| 0 | 3 | Coal and shale |
| 0 | 9 | Indurated clay |
| 0 | 6 | Coal |
| 0 | 2 | Parting |
| 1 | 5 | Coal |
| 0 | 1½ | Shale |
| 0 | 6 | Coal |
| 2 | 0 | Shale, with glossopteris |
| 0 | 7 | Coal |
| 2 | 6 | Shale, full of glossopteris |
| 0 | 6 | Coal |
| 1 | 0 | Metal, with glossopteris |
| 14 | 0 | Sandstone |
| 2 | 0 | Coal |
| 3 | 0 | Coal and shale [horizontal |
| 50 | 0 | Sandstone, &c., with trunks of coniferæ, lying mostly |
| 0 | 8 | Bituminous shale |
| 3 | 0 | Shale |
| 22 | 0 | Conglomerate and sandstone |
| 2 | 1 | Metal mixed with ironstone, full of glossopteris, with trunks of coniferæ |
| 10 | 0 | Grey and black shale, with metal in nodular masses and layers full of vertebraria and glossopteris |
| 10 | 6 | Shale and sandstone |
| 5 | 0 | Sandstone |
| 2 | 0 | Shale and metal |

Below this a series of strata of sandstone, shale, grits, and conglomerates, the upper portion of which beds contains fossils flora and fauna, and about 100 ft. lower the beds contain the marine fossil fauna of the lower carboniferous formation.

No. 9 is a section of the upper coal measures of the southern district, showing the strata and seams of coal about four miles southwest of Coal Cliff, in the parish of Southend, county of Cumberland, New South Wales:—

| Feet | inches. | Description of soil. |
|---|---|---|
| 15 | 0 | Alluvial |
| 15 | 0 | Rock |
| 48 | 0 | Sandstone |
| 0 | 3 | Ironstone |
| 6 | 0 | Sandstone |
| 0 | 4 | Ironstone, &c. |
| 1 | 3 | Shale |

| | | |
|---|---|---|
| 5 | 0 | Coal |
| 7 | 0 | Shale, with vertebraria |
| 13 | 0 | Sandstone and conglomerate |
| 2 | 0 | Coal, fine grained splint |
| 18 | 0 | Shale and sandstone, with ironstone bands |
| 5 | 0 | Coal, fire-clay, and shale |
| 6 | 0 | Coal, with partings |
| 1 | 0 | Shale and ironstone |
| 8 | 0 | Coal, with numerous bands |
| 2 | 0 | Coal |
| 2 | 0 | Rock |
| 0 | 7 | Fire-clay |
| 1 | 6 | Coal |
| 0 | 10 | Shale and coal |
| 1 | 10 | Bituminous shale and dark nodular ironstone |
| 2 | 6 | Coal and shale |
| 0 | 6 | Fire clay |
| 0 | 8 | Coal |
| 2 | 6 | Bituminous shale and fire-clay |
| 16 | 0 | Dark metal and shale, full of vertebraria |
| 8 | 0 | Grey sandstone |
| 0 | 1 | Impure limestone |
| 10 | 0 | Grey post, with fossil stems |
| 0 | 7 | Coal |
| 0 | 6 | Parting |
| 1 | 1 | Coal, with bituminous parting |
| 0 | 6 | Coal and partings |
| 1 | 5 | Coal |
| 0 | 7 | Dark metal |
| 0 | 4 | Excellent fire-clay |
| 1 | 0 | Dark bituminous shale, with vertebraria |
| 7 | 0 | Shale, with bands of limestone |
| 5 | 0 | Sandstone, with bands of limestone. |
| 9 | 0 | Grey sandstone, with thin streaks of vegetable matter |
| 2 | 0 | Coal, with partings (about) |
| 0 | 6 | Ironstone |
| 0 | 8 | Bright bituminous coal sandstone |
| | | Sandstone |

No. 10 is a section showing the strata and seams of coal at Coal Cliff, parish of Southend, county of Camden, southern district, belonging to his Honour Mr. Justice Hargraves:—

| Feet | inches. | Description of soil. |
|---|---|---|
| 15 | 0 | Alluvial |
| 15 | 0 | Rock |
| 5 to 6 | 6 0 | Coal, fine grained splint coal, with bituminous coal, 30 ft. above sea level |
| 20 | 0 | Sandstone and shale |
| 2 | 4 | Coal, very fine grained splint coal |
| 8 | 0 | Fire-clay |
| 28 | 0 | Sandstone and shale |
| 3 | 0 | Coal |
| 9 | 8 | Sandstone and shale |
| 1 | 6 | Coal |
| 21 | 0 | Sandstone |
| 5 | 0 | Shale |
| 0 | 6 | Coal |
| 1 | 6 | Shale |
| 2 | 3 | Coal |
| 0 | 1 | Band |
| 2 | 0 | Coal |
| 1 | 6 | Rock and shale |
| 2 | 0 | Coal |
| 0 | 2 | Band |
| 0 | 5 | Coal |
| 0 | 2 | Band |
| 0 | 5 | Coal |
| 0 | 2 | Band |
| 0 | 6 | Coal |
| 0 | 1 | Band |
| 0 | 6 | Coal |
| 0 | 1 | Band |
| 0 | 3 | Coal |
| 3 | 3 | Metal and fire-clay |
| 30 | 0 | Various strata |
| 0 | 6 | Coal |
| 23 | 0 | Various strata |
| 2 | 0 | Coal, with a parting |
| | | (Distance between these two seams of coal not yet proved, probably 250 to 300 ft.) |
| 1 | 10 | Coal |
| 1 | 0 | Band |
| 3 | 0 | Coal |
| 0 | 9 | Band |
| 1 | 4 | Coal |
| 0 | 7 | Band |
| 0 | 10 | Coal |
| 0 | 1 | Band |
| 0 | 6 | Coal |
| 0 | 1 | Band |
| 0 | 5 | Coal |
| 0 | 0¼ | Bard |
| 0 | 10 | Coal |

Accompanying the above sections is a plan showing where the vertical sections have been taken, and the extent of the New South Wales coal field as far as it has been at present worked.

Iron ore fields are, as usual, associated with the coal measures, and are both numerous and extensive, but they appear to be chiefly confined to the large southern coal field, and although there are no limestone and iron measures marked on the geological map representing the northern coal fields, nevertheless they must exist unless such measures have been denuded before the coal measures were formed. The area of the iron ore fields of New South Wales is 1400 square miles, and as the iron ore deposits are found in close proximity to the coal and limestone measures, they are, consequently, much more important, and of incalculable value. Blast-furnaces, rolling-mills, and other mechanical appliances have recently been erected for the purpose of smelting the ore and converting the crude pigs into malleable iron. We may, therefore, conclude that the Australian and adjacent colonies will, as a matter of course, be supplied from the works of New South Wales. This is a significant fact, and is very suggestive of competition—or, at least, to diminish markets for home manufacture, where, in a general way, the mines are deep and the cost of production increased thereby to a very considerable extent. As we have said all along, there is undoubtedly a prosperous future for Australia. The iron ore of the New South Wales fields is of the class known as hematite, magnetic, chrome, and other iron ores, many specimens of which are shown in the Exhibition. The ore found at Mittagong, in the southern district, is of two kinds—*i.e.*, magnetite-magnetic oxide of iron and brown hematite hydrated oxide. These ores have been proved to contain 66 per cent, of iron. As in some parts of England and Wales, so in the coal measures of New South Wales do we find those peculiar deposits of clay band iron ore which are interstratified with the coal. There is, however, the difference that while the English clayband iron ores are of the nature of impure carbonates of iron, those of New South Wales are of the brown hematite class. The iron ore found in the English coal fields seldom averages more than 30 per cent., whereas that found in the coal measures in the colony under consideration yield as much as 50 per cent. of iron. This is, therefore, not only a matter of great interest to casual observers, but it is one to which existing and intended manufacturers cannot attribute too much importance. There is also another peculiar geological fact which is very likely to prove of considerable value to colonial smelters—*i.e.*, the veins of magnetite are accompanied by a highly ferruginous garnate, which is very rich in iron. It cannot only be turned into advantags as capable of yielding a large percentage of metal, but is also capable of increasing the fluidity of the slag, and thereby facilitate smelting operations.

The total production of iron ore raised in 1876 was valued at 29,355*l.*, and in 1877 it was valued at 30,197*l.* For so short a period as that in which ironworks have been established results are very favourable, exhibiting as they do in a striking degree the capabilities of the colony under judicious and proper development. The Department of Mines, Sydney, exhibit a collection of iron ores. From No. 200 to 236 we have specimens of magnetic oxide of iron, giving by analysis 37·84 to 51·2 per cent. of metallic iron. Brown hematite, brown iron ore, magnetite, micaceous, and magnetic iron, clay-band, iron ore. Iron ore garnate rock from Devonian beds giving by analysis 21·05 per cent. Goethite, fibrous oxide of iron, stalactite iron, specular and brown oxide of iron, and limonite. Nos. 237, 238, and 239 are exhibits of iron castings from the Fitzroy Ironworks. The iron ore exhibited was obtained from 17 mining districts—Wallerawang, Brrima, Solferino, Mount Lambie, Burra Burra, Jamberos, Cooyal, Vale of Clwydd, Broughton Vale, Lithgow Valley, Goldborn, Wellington, Molong, Ponsoby, Parkes' district, &c. The exhibits 240 to 243 consist of bar-iron and pig-iron from Lithgow Valley Ironworks, and the Fitzroy Ironworks. No. 244 is an exhibit of clay-band iron ore. The Commissioners exhibit under 298 10 tons of pig-iron from Lithgow Valley Iron Smelting Company. The geological map of the colony of New South Wales, to which we have before referred, exhibits many copper fields or districts. The largest of these extend a little to the north of the 31° of latitude to the south of the 32° of latitude. It has nearly a central position, between the Wellington, Warreco, and Albert Pastoral districts. It measures over 80 miles in length by 32 miles in width. There are many copper districts from Wellington to a point opposite Two-fold Bay.

The copper lodes in the colony are numerous, but some of the richest are at present beyond the reach of railway communication. Before many years have elapsed, however, this defect will be remedied. The lodes of copper which have been worked vary in thickness from 1 to 5 ft., and the yield by analysis has been from 9 to 49 per cent. of metal. The copper is frequently associated with gold, silver, lead, and sulphur. In 1858 copper was raised to the value of 1400*l.* only, but in 1877 it amounted to the value of 307,181*l.* Up to 1876 the total production of copper amounted to the value of 1,566,232*l.*, and in the same year the copper exported was valued at 249,979*l.* The approximate area of copper lands is 3300 square miles, but the estimate of cupriferous country amounts to 6713 square miles. Numerous characteristic specimens are exhibited, also some large blocks of copper ore, and about 25 tons of metallic copper in ingots. The Department of Mines, Sydney, has forwarded a beautiful collection of copper ores, arranged by C. S. Wilkinson, G.S., F.G.S., Government Geological Survey, and they are numbered from 100 to 105 inclusive, 114 to 119, 128 to 140, 147 to 148, also 150 to 157, 158, 160, 171, and 186. No. 101 assayed 9·40 per cent. of copper, gold equal to 4 oz. 10 dwts.; No. 102 assayed 12·27 per cent. of copper, gold equal to 1 oz. 2 dwts. 20 grs. per ton; No. 122, black oxide of copper from the Belara Mine, assayed 40 per cent. copper; No. 125, sulphide of copper from the Armstrong Mine, assayed 18 per cent., with 7 dwts. of gold and 3 ozs. of silver per ton. Several other specimens assay 11·30, 16·72, 27, 33, 39, and 25 per cent. of copper per ton.

Specimens of antimony, lead, and silver are exhibited, and numbered from 245 to 278. Under the head "Miscellaneous Minerals," exhibited by the Department of Mines, we have specimens numbered from 487 to 525. There is also a private collection numbered from 17 to 57 inclusive. Mr. Joseph Paxton also exhibits specimens. Prof. A. Liversidge, F.G.S., and Mr. J. L. Bensusan also exhibit a large collection of all the kinds of minerals to be found in New South Wales, consisting of the various forms of copper, tin, silver, pyrites, iron, lead, graphite, bismuth, manganese, gold, one of the most remarkable of the latter being gold in mispickel from Lucknow Mine yielding from 30 to 300 ozs. per ton. There is also another sample of gold with iron pyrites and quartz producing 358 ozs. per ton. There are also several specimens of ore containing mercury, zinc and molybdenum, and nickel. Building stone is also largely represented from the numerous quarries surrounding Sydney. The colony is also rich in marble of Silurian and Devonian ages. The Black variety from the Marulan, and the White from the Cow Flat Marble Quarries, have been used in flooring the great hall of the Sydney University. This marble seems to consist of thick beds of coralline limestone of very pure quality, the general tints being white, cream, dove coloured, and pink markings. Granite also occurs in great abundance in the colony. The production of cultivation and trees and natural history are largely represented, specimens being both numerous and interesting. Agricultural products not used for food, such as silk, tobacco, and wool, are also well represented. The grape vine is cultivated to a considerable extent; the produce for 1877 yielded 799,709 gals. wine, and the total produce of the vineyards would include about 3000 gals. of brandy, and upwards of 1000 tons of fruit for home consumption. The growers of the vine are well represented. Under classes 1, 2, 4, and 5 there are exhibited a fine collection of oil paintings, architectural drawings, and engravings. Class 12 includes photographs; these are numbered from 1 to 64 inclusive. There is also an additional collection. All these represent some particular building, place, or person in the colony. To December 1877, the population amounted to 662,212. The revenue was 6,961,887*l.* The expenditure was 6,030,410*l.* The imports amounted to 13,672,776*l.*, and the exports to 13,003,941*l.* There are 642 miles of railway constructed, 279 under construction, and 690 projected; there are also 9761 miles of telegraph constructed, and 1118 miles under construction. The capital of the banks amounted to 7,970,000*l.*, and the deposits were 14,859,505*l.*

## FOREIGN MINING AND METALLURGY.

Belgian ironmasters still complain a great deal of the extremely low point to which prices have declined. At the same time it would appear that orders have come to hand tolerably regular upon both home and foreign account. Plates, girders, and merchant iron have been especially in request. The manufacturers of heavy rolling stock and the proprietors of steelworks are less well off for orders; they now require, indeed, very large orders to enable them to respond to their very extensive means of production. The administration of the Belgian State railways will let next week a contract for the supply of passenger carriages, baggage vans, &c.; the importance of this impending contract is not, however, very definitely known. A contract is to be let next month for the works of a new station at Bruges; the cost of these works is estimated at 32,640*l.* There appears to be a "hitch" in regard to the orders for 21 locomotives for the Belgian State railways, although it was recently stated that these orders had been definitely given out. The council of the British Iron Trade Association is endeavouring to secure a remission of the import duties now imposed on English pig-iron entering Belgium. The Thy-le-Château Company has secured a contract for 1500 tons of iron rails, to be delivered to the company formed for working the Netherlands State railways. The price to be paid for these rails is 11,199*l.* The Acoz Forges Company asked for 12,300*l.*

The direction of the Wurtemberg State Railways is about to let a contract for 84 passenger carriages and 442 goods trucks. The directors of the Herné Bochum Collieries Company report that the extraction of coal effected by the company amounted 495,375 tons in 1877, as compared with 441,655 tons in 1876, showing an increase of 53,720 tons, or 12 per cent., last year. The average sale price declined from 7*s.* per ton in 1876 to 6*s.* 1*d.* per ton in 1877. The working expenses were, however, reduced in a still greater ratio last year. The profit derived from working amounted for the year to 37,377*l.*

M. Von Scherpenzeel-Thün, engineer-in-chief of mines in the province of Liége, has just reported on the coal mining operations carried on in the province last year. Those operations appear to have been attended with deplorable results. Thus the general outcome of the year's working was a loss of 47,760*l.*, while 1876 resulted in a profit of 40,500*l.* The sad balance-sheets of 1877 must necessarily exert a considerable influence upon the future working of coal in the Liége group. The number of workpeople employed in coal mining in the province of Liége in 1877, as well above as below ground, was 23,215. The aggregate amount paid in wages during the year was 800,368*l.* The total extraction of coal effected in the province in 1877, was 3 038,000 tons, as compared with 3,368,000 tons in 1876. It appears that 26 mines in the province were worked at a profit last year, while 42 mines were worked at a loss.

Transactions in the iron trade of the Haute-Marne (France) group have not presented very much importance. It is only small lots the delivery of which is pressed for. Refining pig has ranged from 4*l.* 6*s.* to 4*l.* 14*s.* per ton. No. 3 pig for recasting has made 3*l.* 6*s.* per ton. Coke-made iron rails have realised 6*l.* 12*s.* per ton, while iron from coke-made pig has brought 6*l.* 16*s.* to 7*l.* per ton, and mixed iron 7*l.* 12*s.* to 8*l.* 8*s.* per ton, according to the works. Sheets have made 8*l.* 16*s.* to 9*l.* 4*s.* per ton, according to quality, coke or mixed; and plates for construction have realised 8*l.* 16*s.* to 9*l.* 4*s.* per ton. In the Nord business has not shown a completely satisfactory activity, still orders have not made default. In the Loire-et-Rhone group orders have presented some little improvement, especially for plates.

## Meetings of Public Companies.

### THE BOLIVAR RAILWAY COMPANY.

The sixth annual general meeting of shareholders was held on Monday, at the City Terminus Hotel, Mr. JAMES ANDERSON (Chairman of the company) presiding. The directors' report (which was taken as read) stated that the line was opened throughout on Oct. 11, since which time the train service had been regularly and efficiently maintained between the port at Tucacas and the mines at Aroa. Warehouses had been erected at Palma Sola and La Luz stations, and the terminus at Tucacas, where merchandise and produce could be safely stored. The amount earned on traffic account to the end of the year 1877 was 19,490*l.* 14*s.* 2*d.*, which has been applied in reduction of the capital expenditure to that date. The quantity of ore carried over the line and shipped up to the end of the year was 4503 tons.

The CHAIRMAN, in moving its adoption, said shareholders would observe from the report that it became evident very soon after the opening of the railway that the Quebrada Company would be unable to supply ore in quantity and of such quality as would fulfil the terms of its original contract with the Bolivar Company. It was thus deemed expedient to put the original contract in abeyance, and consequently a fresh contract was made for the term of twelve months, by which the Quebrada Company bound itself to supply at least 20,000 tons of ore. Any surplus realised by the sale of this ore up to the rate in that original contract was to be the property of the railway company. By the last advices about 2500 tons of ore had been shipped under a fresh agreement, and which was believed would nearly cover the rate of carriage as regarded the traffic outside the Quebrada Company's contract. The sum of 19,400*l.* 10*s.* 7*d.* had been earned during 1877, about 12,000*l.* of which arose from the carriage of general traffic, the remainder being the net result, and the bulk was subject to heavy deduction for animal carriage. During the first four months of the present year there had been conveyed from Tucacas to La Luz about 325 tons of merchandise, and *vice versa* of produce of about 1000 tons. Referring to the passenger traffic and to the wretched state of the roads, he mentioned as a fact that persons had been living all their lives within 60 miles of the coast without having seen the sea. Under these circumstances it was encouraging to find that during the first four months of the present year the passengers carried amounted to 762. The board were offering every possible encouragement for the construction of roads which would prove feeders to the railway. As regards the probable outside traffic, the board had no certain statistics by which to guage the probable amount, but they believed that the increased facilities provided would stimulate the construction. During the construction of the railway the labour rate had been high, owing to the wages paid by the contractors to induce labourers to attend. The wages had since been reduced, and contractors would keep further reductions steadily in view. The board continued to employ as far as possible native labour, and the health of the staff had continued good. The difficulties with which the board had had to contend from time to time in the construction contracts were, happily, now at an end. The line had been recently inspected by one of their contractors, and his report agreed with those which had been received from the company's own officers—that the line was efficient and at present in fair working order. In conclusion, he congratulated the shareholders upon the completion of the railway, which, although delayed beyond the time stipulated in the contracts, had been accomplished in the face of exceptional difficulties. The construction period ought, he said, to have closed with the year 1877, although certain capital expenditure, such as the settlement with contractors, would come into the accounts for the year 1878. He then formally moved the adoption of the report, which was seconded by Mr. W. T. MERCER, and carried unanimously.—Some routine business was then disposed of, and a vote of thanks to the Chairman and staff, proposed by Mr. SKINNER, terminated the proceedings.

### ALMADA AND TIRITO CONSOLIDATED SILVER MINING COMPANY.

An extraordinary general meeting of shareholders was held at the office of the company, Finsbury Circus, on Wednesday—Mr. MARTINEAU in the chair—for the purpose of considering and, if deemed desirable, passing the following resolution:—"That the directors be and are hereby authorised to issue on such terms as they may from time to time deem expedient 820 mortgage debenture bonds of 10*l.* each, for three years, being the balance unissued of the 20,000*l.* ten per cent. mortgage debentures authorised to be issued by resolution dated May 29, 1874, and that they be offered in the first instance amongst the shareholders of the company, and that the directors are hereby authorised to issue any that may not be taken up by the shareholders to the general public."

Mr. J. A. MORGAN (solicitor) read the notice calling the meeting.

The CHAIRMAN said the shareholders were aware that at the last meeting a little difficulty arose with regard to the formality of the notice calling the meeting, and therefore the resolution could not be put. The resolution had been drawn up in accordance with the wishes of some of the largest shareholders, who were best able to form an opinion as to its form. He had little to add to the reasons which he gave at the last meeting why the shareholders of the company should take up these debentures. Unless the directors thought the mine was a really good one, and had really good reasons for believing that the mine would develope into as good a mine as ever it was, the directors would not feel justified in recommending the issue of the debentures, but they offered them to the shareholders because they believed that the company's property was really likely to turn out exceedingly well. This was a question which affected the shareholders as much as the directors, as they were all in the same position. From the last letters which had come to hand they would see that in all points of the mine, and in the lowest levels, there was every reason to believe there was good ore, and that a good mine would be developed in depth. To strengthen that view the directors had had some further assays of samples which were laid upon the table at the last meeting. The samples Nos. 3, 4, and 5, from the lowest levels of the Mina Grande Mine, were mixed together, and they assayed 303 ozs. to the ton, which was extremely good, and certainly did not give any indication of the mine giving out in depth at that point; and, in fact, at other points in the mine there was every indication that it would improve in depth. He was assured, upon the authority of a gentleman who had had much experience of mining in similar formations in the adjoining territory of Nevada and Utah, that such a thing as a lode like this giving out in depth was unknown. It must be borne in mind that at present the mine was very shallow; below the adit level they were not more than 50 fms. They should also bear in mind that the mine had yielded since it had been in the hands of the company over 200,000*l.* worth of silver ores, and that 35,000*l.* had been paid in dividends. There was no doubt the Almada family made a large fortune out of the mine. Compared with the depth of some other mines in Mexico, the depth of this mine would be called merely scratching the surface. Many other mines had passed through poor bands of ground. He was not at all sure whether the really valuable ores were not left standing right and left; it would almost seem to be so in the Providencia, where there was a parallel lode, and in the Mina Grande Mine there was a regular body of ore running through, which went down. There was no reason the Dice Padre Mine should not also be a very rich mine. With all these facts before them there was every reason to believe that they possessed a fine property, and it would be an act of insanity not to do everything to develope it. Every possible precaution would be taken in the matter of the expenditure of the money. The directors of the company did not think that they ought to trust entirely to the skill and ability of parties they had out there, and possibly the directors might deem it advisable to obtain the

opinion of a practical man accustomed to mining in the district, and who was not hampered by old Cornish notions. He moved the adoption of the resolution.

Mr. J. P. G. SMITH seconded the resolution. He agreed with the Chairman relative to the good prospects of the mine, and said he should take up debentures in proportion to the number of shares which he held.

Mr. SWAFFIELD thought there was every encouragement to prosecute the mine in depth, and he believed they had reached a turning point, and that there were better prospects before the mine. As regarded the sending out of someone else, he thought they ought to be as economical as possible at the present moment, and he did not think it was necessary to send anyone out at present.

Mr. S. J. WILDE said he rather endorsed the view of Mr. Swaffield with regard to the undesirability of sending out another man at present.

Mr. MORGAN said they wanted a report of a character rather larger and different than could be given by the present men, such as to whether the ores should be sold as ores, or lixiviated, and other similar points, and for that reason the directors thought it desirable to send out a good man, which would cost, including report, about 500*l.*

Mr. LITTLEHALES, jun., who has recently visited the mine, bore testimony to the careful and economical working of Mr Breach, and said that from all he could ascertain from a personal inspection he believed they had a really good mine.

The CHAIRMAN said the directors under any circumstances would wait for further advices before they sent out anyone to report, and the board would bear in mind what had been said regarding the necessity of the utmost economy.

The resolution was then put to the meeting and carried, and it then broke up.

## WEST MOSTYN COAL AND IRON COMPANY.

The fourth annual general meeting of shareholders was held at the City Terminus Hotel, on Monday,

Col. J. D. SHAKESPEAR in the chair.

In the absence, through indisposition, of Mr. John Davies, the secretary, the notice calling the meeting was read by the Chairman.

The minutes of the last meeting were read and confirmed.

The CHAIRMAN said he must congratulate the shareholders that the Treaty of Peace had been signed, as they had no doubt seen by the Times of that morning, and he hoped that would be a good omen for all concerned with coal and iron. The affairs of this company had been so often laid before the shareholders, both at public meetings and by circular, that he might almost say the whole subject was exhausted; still, a little retrospect might do good. He would call attention to the circumstance that in August, 1876, the engineer's estimate for completing these works was 60,000*l.*, but by the following April that sum had become reduced to 40,000*l.*, and that latter sum was stated to be sufficient to make the works complete. Upon that the shareholders authorised the issue of 43,000*l.* of 7½ per cent. debentures, and to those debentures was to be added a like amount of deferred shares; but there seemed some uncertainty about the deferred shares, and consequently that was cancelled. It was then proposed to raise 40,000*l.* by 10 per cent. debentures, omitting the idea of making an addition of the deferred shares, and the result of this was an application for about 8000*l.* At that time a promise was given, or implied, by the board to the shareholders, that they would not fritter away a small amount, and that to commence work which would cost 40,000*l.* with so small a sum as 8000*l.* would be very injudicious. But it might be remembered that he at that time explained that if the 20,000*l.*, which was to be the first issue of the proportion of 40,000*l.*, were not raised an alternative scheme might be proposed. He had had that scheme in his head for some time, and the result of that idea was explained to the shareholders in his circular of April 11 last, whereby Mr. John Higson proposed to complete the works sufficient for an output of 150,000 tons of coal per annum for 17,290*l.* Well, they had half of that sum subscribed, but the directors did not quite see their way to larger subscriptions, and therefore the board did not consider themselves warranted in ordering Mr. Higson to commence work. Besides that, the whole policy of the board had been one of waiting. The directors had known, and the shareholders must also have known, that the coal trade was in a very serious state of depression, and there could be no doubt that the war had had a very great influence upon that depression of trade, and they were hoping that peace would be restored, and that on the restoration of peace there would be a rebound in trade. Well, their expectations on that point had come true; peace had been signed, and there was every prospect of the development of the Eastern part of Europe and the Western part of Asia. He, therefore, felt certain that that must cause an increase in the demand for coal and iron, and he thought that the prospects of the company were very materially improved. Under these circumstances, and looking at the improved prospects, it would have been a very serious thing to allow this company to fall through. The shareholders had heard over and over again of its great value; the quantity of coal was something enormous, and its excellence was undoubted. Mr. Higson had stated the possibility, or rather the probability, of their being able to make from 1s. to 1s. 6d. per ton even at the present price. He himself did not think very much, as far as the company was concerned, about the difficulty in the coal trade, because the exceptional advantages which the company possessed must always command that trade. The colliery was close to the mouth of the River Dee, close to the coast of Ireland, and close to Liverpool, and it had been often said that the company possessed some of the finest steam coal in the world. It was hardly possible that the coal trade could get worse, but in spite of its present bad position Mr. Higson felt certain we could realise 1s. per ton at present prices, and that upon 150,000 tons would pay 10 per cent., and labour was now somewhat cheaper, and materials less costly than six or eight months ago. He believed the true policy of the company was to continue to wait. He did not see what else there was to be done, and he was convinced that a day would come, and very shortly too, when this property would become of enormous value, and it would be a great pity if the shareholders allowed it to slip into other hands He moved the adoption of the report and accounts.

Mr. J. O. SURTEES seconded the resolution. He was sorry the third director, Mr. Rylan , M.P., could not be present to-day, as he generally had been, because that gentleman's knowledge of the locality and the property enabled him to give the shareholders very valuable information. The directors knew they had a good property, and had told the shareholders so again and again. It would be a sad thing to have it sacrificed and sold just now, because the shareholders would have to pay the winding-up expenses. There was no doubt that if the money subscribed for twelve months ago had been obtained at the present moment every shareholder would be receiving a dividend upon his outlay. After a period of depression almost the first thing which went up in price in this country was first iron and then coal, and this company ought to be prepared to take advantage of the rise as soon as it came. At the meeting two years ago, when he was asked his opinion about the finances of the company, he told them they would have enough to go down to the coal, and win the coal, and finish the first pit, and possibly enough to begin the second. That had turned out to be correct. The coal was all that had been anticipated, and all that was now wanted was a smaller airshaft to meet the requirements of the Act, and they could raise the coal through the present shaft. Originally they had applications for nearly 8000*l.*, and a fair proportion of that was promised by the directors themselves. Out of that 8000*l.* a certain proportion was applied for conditionally upon the whole 20,000*l.* being subscribed; since then some of the persons subscribing were dead, and others had become impatient and had withdrawn their subscriptions, and at the present moment the directors could not even pledge themselves to the 8000*l.* which they could have done twelve months ago. He concurred with the Chairman that the better course now was to wait until better times came.

Mr. LAWRENCE KEITH said that supposing they adopted the policy of waiting had they sufficient funds to go on? There was but a small balance in hand, and there seemed to have been an expenditure of 20 0*l.* He would pass over the directors' fees, but he would ask how it was that there had been such a large expenditure for law? Referring to a small expenditure of 14*l.* odd for a safe he remarked that he could not see that the company had much use for it, and he should have thought that the affairs of the company had been sufficiently looked up already. (A laugh.) He asked whether any steps had been taken to ascertain what sum could be realised for the mine if sold? He thought it would be better to sell the mine outright rather than dispose of it under a forced liquidation. He fully agreed with the Chairman that the company possessed a most valuable property. He was pleased to hear that a part of the debentures had been subscribed by the directors.

Mr. W. H. HILL, of Coventry, said he had come 100 miles to attend the meeting, and if the general body of shareholders felt the same interest in the company that he himself did they would have had a much larger attendance to-day. He thought the directors' fees seemed to be large, and he enquired how it was that the number of the directors was reduced to three? He was not surprised that the debentures had not been subscribed, as many coal and iron companies had been coming to grief lately. He believed the company possessed a most valuable property, and that there should not be any difficulty in borrowing 10,000*l.* or 15,000*l.* upon the security of it at a reasonable rate of interest. If the waiting policy were adopted, what would be the condition of the pit; would it not get into a foul state and filled with water, so that a great outlay would be required to bring it into the same condition in which it was left? For his own part he should be very sorry to see such a valuable property sacrificed.

Mr. WHITE said he subscribed towards the debentures as far as he was able. He thought the policy of the board was to wait until people had more money to spend. It was important to keep the expenses as low as possible, and the only expenditure they need have at the colliery would be 2*l.* or 3*l.* a week for one or two men to keep the engine, &c., in repair. He thoroughly agreed that this was a good company, and if the property were properly nursed the shareholders ought not to lose a shilling. He was glad the shareholders had adopted a waiting policy. As regarded the directors' fees, he pointed out that the board had had a most anxious and unpleasant task to perform, and this should be taken into consideration in connection with the amount of directors' fees. If at the end of 12 or 18 months the shareholders were unwilling or unable to find the money, they must then look round and see what was the best course to adopt. He proposed to allow the deposits to remain for the benefit of the company, so as to keep the colliery open for another 12 or 18 months.

Mr. HILL said he hoped the shareholders could see their way to adopt the waiting policy of the directors, and pointed out the necessity of using the utmost economy.

The DIRECTOR in reply to further remarks, said that the engineer had had no salary the last half-year. The directors were doing all they could in the direction of economising.

Mr. WILLET said there was considerable dissatisfaction in the North with respect to the mode in which the company was carried on, and many of the shareholders objected to a London office being kept, considering that an office near the mine was quite sufficient for the requirements of the company. He thought the best way to get money would be to obtain it from one or two capitalists, as the debenture system seemed to be an utter failure. One of the weak points of the company was the enormous nominal capital. He thought they ought to quash the 400 shares in hand. Let them diminish the capital to something like a real one, and try and get a partner to bring more money in.

The CHAIRMAN, referring to the remarks about the expenses, said it must be borne in mind that for one-half of last year the colliery was at work, as Mr Higson was asked to drive a gallery to try the coal. Of course if it were a charge for simply pursuing a waiting policy the expenses would be excessive, but, as he had said, there was work going on for half a year. As regarded the travelling expenses of 121*l.*, several shareholders, at the invitation of the directors, had visited the mine, and all the expenses of the visit of those gentlemen had been paid by the company. As regarded the doing away of the London office, it might suit the views of gentlemen in the North, but he scarcely thought it would meet the approval of shareholders in the South of England and near London. Lancashire held one-fifth and Manchester one-tenth of the whole property, whilst within half an hours' distance from London 2229 shares were held, as against 1400 in Lancashire. He might mention that the expenditure at the mine had been cut down to 4*l.* per week.

Mr. J. O. SURTEES said that with regard to the price which could be realised for the mine, he did not think it advisable to hawk this property about, especially as there were people who would be glad to obtain it at a wrecker's price. If they were obliged to sell the property they would be in a position to obtain a better price for it by adopting a waiting policy. As regarded the amount of law expenses, they were in connection with the fresh leases from Sir Piers Mostyn, and were charges which could not be avoided. As regarded the directors' fees, he could only say that he objected on principle to directors being called upon to give their time and labour for nothing. If the shareholders thought he could be of service he would remain, and do the best he could to bring the company to a successful issue, but it was a post which he by no means coveted, and he should be only too glad if the shareholders would relieve him of it, and appoint some other gentleman in his place. At the same time, looking at the position of the company, he was willing, not to forego his right to fees, but to wait for payment of all fees accruing from June last until better times.

The CHAIRMAN, in reply to a further observation, said that the mine was kept in such a condition that when the money was found the water could be pumped out, and the pits got to work in 48 hours. Therefore, there was no harm resulting from the waiting policy.

After some further discussion of an unimportant character, the resolution for the adoption of the report and accounts was put to the meeting, and carried.

Mr. WHITE said he had very great pleasure in moving that Colonel Shakespear be re-elected a director of the company. Knowing the work which Colonel Shakespear performed, he had no hesitation in saying that the company had much to thank that gentleman for. He was sure Colonel Shakespear would bear in mind what had been said about the necessity of economising as much as possible.

Mr. WILLET said he had great pleasure in seconding the resolution, feeling that the company could not be in better hands than those of Col. Shakespear as as chairman.—The resolution was put and carried.

The CHAIRMAN acknowledged the compliment, remarking that he was in no way answerable for the origin of the company, but was brought in afterwards to help by his late colleague, Mr. Shaw, and he could only say that since he had been on the board he had done the best he possibly could to promote the welfare of the company in every possible way.

Mr. SUTTON proposed the re-election of Mr. Surtees as a director, which was seconded by Mr. WILLET, and carried.

The Auditors, Messrs. John Adamson and Harry W. Adamson, were re-elected, and a vote of thanks having been passed to the Chairman and board, the meeting broke up.

[For remainder of Meetings, see to-day's Journal.]

## THE SCOTCH MINING SHARE MARKET—WEEKLY REPORT AND LIST OF PRICES.

During the past week the announcement that the signing of the Treaty of Berlin had accomplished the much desired peaceful end of the Congress has imparted great strength to many departments of the investment markets, but mining and metal securities have as yet benefited very little. That they will eventually have as great, if not a greater, rise than any others is quite certain, but the demand has not extended to them yet, though it will not probably be long now till those who have held them so long and patiently will be gratified by noticing their investments daily in greater demand. A revival in trade is confidently anticipated, and already business is being more freely entered into, since the political uncertainty has been got rid of. It would, however, not be prudent to lose sight altogether of the present condition of trade in purchasing shares which may have begun to rise.

In shares of coal and iron companies Bolckow, Vaughan, A, have advance 35s per share, Nant-y-Glo and Blaina (pref.) 30s., Ebbw Vale 13s. 9d., and Marbella 2s. 6d., but Benhar are 2s. 6d., and Chillington 1s. 3d.—both easier. Sheepbridge shares are lower, at 25 dis., as a call of 5*l.* is due Aug 1; as there are 4970 shares, the capital thus raised will be 24,850*l.* Andrew Knowles and Sons are at 5 dis.; Bilson and Crump, 65s; Bolckow, Vaughan, A, 57 to 58; ditto, B, 36; ditto (pref.), 20⅜; Chillington 41s. 3d.; Cardiff and Swansea, 17s. 6d.; Cairntable, 8; Ebbw Vale, 8⅝ to 8¾; Great Western, 45s.; John Brown and Co., 15 dis.; John Bagnall and Sons, 29s. 3d.; Muntz's Metal, 16¼; Newport Abercarn, 60s.; Nant-y-Glo and Blaina (pref.), 20 to 21; Park Gate, 22½ dis.; Pelsall, 14½ dis.; Rotherham, Masbro, and Holmes 6 per cent. (pref.), 10½; Rhymney, 16; Sandwell Park, 14½; Spon Lane, 6½ dis.; South Wales, 5¼; Thorp's Gawber Hall, 40s.; Tredegar, A, 10½; West Cumberland, 8¼; West Mostyn (pref.), 17s.

In shares of foreign copper and lead companies, Cape have advanced 30s., Huntington 3s. 6d., and Tharsis (new) 2s. 6d., while Tharsis (10*l.* paid) are 3s. 9d, and Panulcillo 2s. 6d. both lower. Tharsis touched 24*l.* 18s. 9d., but have since been weak. The sale by the Cape Company on the 3rd inst., 500 tons, averaging 12s. 5½d per unit, realising approximately 925*l.*, is an improvement, and the next sale will be a similar quantity. Hultafail are at 65s. Panulcillo, 15s. to 17s. 6d Rio Tinto 5 per cent., 66.

Shares of home mines are very freely offered of every kind, but buyers are shy, consequently little business can be done. Aberdaunant are at 7s. Bodidris, 21s. 3d. Bampfylde, 5s. Bedford United, 3s. 9d. Cargoll, 7s. 6d. Carn Brea, 39½. Cook's Kitchen, 27s. 6d. Clementina, 27s. 6d. Combmartin, 5s. D'Eresby Consols, 9¼. D'Eresby Mountain, 70. Deep Level, 3 to 5. Dolcoath, 29. Devon Consols, 45s. East Caradon, 6s 3*l.* East Pool, 8½. East Chiverton, 25s. Gawton United, 8s. 9d. Glenroy, 16s. Great Laxey 1¼ ex div. Gunnislake, (Clitters), 11s. 3d. Herodsfoot, 75s. Hingston Down, 6s 3d. Ladywell, 15s. Marke Valley, 11s. 3d. Mellanear, 77s. 6d. Mwyndy, 40s. North Laxey, 1s. to 3s. Pateley Bridge, 20s. Pensruthal, 3s. 9d. Phœnix United, 42s. 6d. Prince of Wales, 1s. 3d. South Caradon, 69. South Condurrow, 11⅞. South Crofty, 7¾. South Frances, 57s. 6d. Tincroft, 95½. Van Consols, 5s. West Chiverton, 8¼. West Frances, 62s. 6d. West Godolphin, 17s. West Seton, 12½. West Tolgus, 58½. Wheal Crebor, 11s. 3d. Wheal Kitty (St. Agnes), 35s. Wheal Peevor, 6½. Wheal Uny, 21s. 3d.

In shares of gold and silver mines Richmonds improved to 13¼ on declaration of a dividend of 1*l.* per share, payable July 20, but have since been weak, though still showing 7s. 6d. per share higher for the week. Flagstaffs are lower on a petition to wind up, although the reports from the mine are very favourable, and it is said the litigation is turning more in the company's favour. Javali has a profit to announce of 540*l.* on May. Several of the reports for June are also issued. Don Pedro produce 1050 oits; London and California, estimated clean-up, $8000; Sierra Buttes, a surplus over expenses of $53 7; and for Plumas Eureka, as much as $13,593. Argentine are at 10s.; Birdseye Creek, 15s.; Cedar Creek, 2s. 6d. to 5s.; Colorado United, 5⅝; Eberhardt, 6⅝; Emma, 2s. 6d.; Exchequer, 2s. 6d. to 5s.; Frontino, 40s.; Gold Rum, 6s. 3d.; I X L., 2s. 6d. to 3s. 9d.; Javali, 8s.; St. John del Rey, 235; South Aurora, 2s. 6d. to 5s.; Tecoma, 3s. to 4s.; United Mexican, 75s.

Shares of oil companies are quite neglected. Young's Paraffin, 3s. 9d., and Uphall, 1s. 3d.—both lower. Runcorn Soap and Alkali are at 7¼ dis.

In shares of miscellaneous companies, London and Glasgow Engineering and Iron Shipbuilding shares have changed hands at a reduction of 15s, but Phospo-Guano are 1s. 3d. higher, and have been done at 8¾, closing 8¼ to 8¾. The Scottish Wagon Company's dividend is announced at the rate of 6 per cent, being the same as last year. The Liverpool Rubber Company pays a dividend this time of 23s 9d. on the ordinary shares, and 17s. 6d. on the preference shares. A call of 2*l.* per share was made payable on the 15th inst., and another also of 2*l.* per share, due on Oct. 15, on Union Rolling Stock Company's new shares, which will then have 5*l.* paid-up. On the 6 per cent preference shares of the same company three calls fall due on the 15th inst., Oct. 15, and Jan 15 next of 3*l.* per share, and 1*l.* per share on April 15 next, which will make them fully-paid (20*l.*) As there are 2230 of the new shares, and 835 of the preference shares, the capital thus raised will be 17,770*l.* Milner's Safe have improved to 9¼. Native Guano, 90s. The following are the quotations for the principal wagon companies shares:—Birmingham, 17¾; ditto 6 per cent. (pref.), 11⅞. Bristol and South Wales, 7¾. Gloucester, 8¾. Metropolitan, 67s. 6d. prem.; ditto 6 per cent. (pref.), 5¾. Midland, 16½; ditto 6 per cent. (pref.). 2s. 6d. prem. Railway Carriage, 5½; ditto 6 per cent. (pref.), 5¼. Scottish Wagon (new), 82s. 6d Swansea, 32s. 6d. Union Rolling Stock 6 per cent. (pref.), 10. Chemical companies shares steady. Newcastle unaltered at 41s. 3d., and Lawe's at 8 to 8¼, but Lawe's 7 per cent. (pref.) are in request. Langdale easier at 90s.

Owing to the improvement looked forward to in every branch of trade since the Eastern affair has been settled, many new concerns are now being actively got ready to be introduced as public companies as soon as possible. One of considerable promise may be mentioned, which is to take up an entire lead sett. It is surrounded by mines all of which have paid large dividends, though they may now be hardly remembered. Some highly productive lodes pass through it, one of them having been worked at an adjoining mine, and yielded 12,000*l.* profit yearly for a long time. The working at this sett has been confined to a very shallow depth, but several hundred tons have been raised and sold. A pitch is at present being worked by tributers that will produce from 20 to 30 cwts. per fathom. This pitch is in the bottom of the deepest level in the mine, and a level is being started to come under it about 20 fms. deeper. There are already 20 fms. driven of this new level, and other 25 will, it is expected, bring them under the point referred to. When this is attained, and dressing machinery erected, good returns of lead can be made at once, and place the mine in a dividend-paying state, as is evident from the present appearance of the lead in the tribute pitch. There are good roads and tramways, also an agent's house and office, carpenter's shop, and smithy, on which very little will require to be expended. The distance to the railway station by a good road is six miles. As all the heavy preliminary work has been done, it is probable that this is one of the properties which will attract the attention of most investors, for only a very moderate capital will be required to develope it.

PONTRHYDGOCH SLATE QUARRY.—A company is being formed to purchase this good property, situate near Pwllheli, in Carnarvonshire. It is ready opened, and slates can be sent to market at once. The price will, it is believed, be fixed very low, owing to the flat state of trade in that county. Some 20 years ago nearly 20,000*l.* was spent on this property by a company, which, unfortunately, was all lost, owing to their becoming involved in legal disputes. These occurred through the proprietors of the adjoining lands asserting that the bed of the river once ran through the middle of the quarry, and that they were, therefore, entitled to the half of it. In the end, it was got out of Chancery by an amicable arrangement between the several parties, by which they now grant one tack-note for the whole lands. The enterprise is one which it is believed will be most profitable.

On Contango-day the following were the rates of continuation current:—Contangoes: 9d., 1s. on Benhar Coal, 1d. on Glasgow Caradon, 1d. on Glasgow Port Washington, 1d. on Huntington, 2½d. on Marbella, 1d. on Monkland, 9d., 1s. on Richmond.—Backwardations: Even, 3d., 1½d. on Tharsis, 4½d., 6d. on Uphall Oil, even, 3d. on Young's Paraffin. On comparing the making-up prices for the following shares fixed to-day with those of the same shares at the previous settlements, the variations thus shown for the account confirm the general favourable tendency of business:—Glasgow Port Washington, Tharsis, and Ditto (new) have each advanced 7s. 6d. per share; Marbella, 5s.; Huntington, 6d.; and Uphall Oil, 3d. Canadian Copper are unaltered, also Glasgow Caradon, Monkland, Oakbank Oil, Omoa and Cleland, and Rio Tinto; while Young's Paraffin are 6s. 3d. lower, Benhar 5s., and Richmond 3s. 9d.

ERRISBEG MINING COMPANY (Limited).—There can be no doubt this will be the next prize in the mining world, as, even with copper at the present price, the mine is so shallow and the ore so rich and abundant that immense profits will be made. The agent is a practical Cornish miner, and there is a great improvement reported in the mine since we first referred to it. The shares have advanced to 3*l.* each, and the utmost confidence is felt that before many months they will rise cent. per cent.

SOUTH DE ERESBY MOUNTAIN LEAD MINING COMPANY (Limited).—The shares in this company's property, which we referred to last week, continue to be pressed for sale by unknown parties. Attention has also been directed to it by a report from one of the leading mining experts. The operations at the mine seem to be conducted in a good style. An increased area has been obtained, so as to drive the deep adit from a point further down the hill, and thus unwater the mine by gravitation. A greatly enlarged depth of ore ground will thereby be obtained without the expense of pumping. Two of the lodes are worth, even at the present shallow depth, from 1 to 1½ ton per fathom, and from the number of lodes in the mine it would not be surprising if they did meet with something good.

BRICK WORKS.—Bricks are very inexpensive to manufacture, and still very profitable, for the money invested is, as a rule, quickly returned in profits. A small company is being formed to purchase a property in which a most valuable clay earth has lately been discovered, and which can be had on very easy terms owing to the trade being a new one for the district. The property being freehold will be purchased outright. It lies within half a mile of the railway, and the earth runs through the length of the property, the breadth of which is from 400 to 500 yards, and makes a very good brick.

J. GRANT MACLEAN, Stock and Share Broker.
*Post Office Buildings, Stirling, July 18.*

SAFETY LAMPS.—A lamp intended to render it impossible for the lamp to be opened without extinguishing the flame has been invented by Mr. R. MORTON, of Wishaw, who states that this may be achieved by means of a short central tube, which is carried upon a bridge-piece, or otherwise conveniently supported at the interior of the lower part of the lamp in the neighbourhood of the burner which it surrounds. When the burner is in its place the central tube hereinbefore referred to is in such position that it will not interfere with the flame of the lamp, but on the lamp being opened the burner and the flame are drawn down through the tube, which has the effect of instantly extinguishing the flame. Before replacing the lower part of the lamp and the burner the extinguishing tube is taken out from the upper part of the lamp and placed over the burner before it is lit, so that the lower part of the lamp with the burner and extinguishing tube are placed in the upper part of the lamp at one operation, the bridge or the equivalent thereof, by which the extinguishing tube is supported, being made of a spring which catches on projections to receive and hold it in the required position, The second object of the invention is achieved by placing one or more tubes vertically in the oil vessel with their upper and lower ends soldered into the upper and lower ends of the oil vessel. Above the upper ends of these tubes a disc or shield of wire-gauze is placed, which, being below the level of the burner, enables the air to be evenly distributed to it. In place of using the vertical tubes hereinbefore referred to openings may be formed in any other convenient parts of the lamp so as to admit air at the lower part of the burner.

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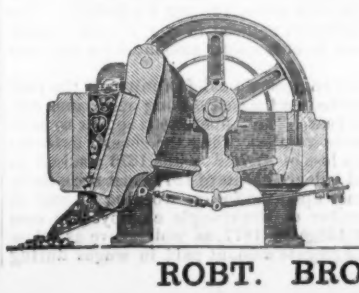

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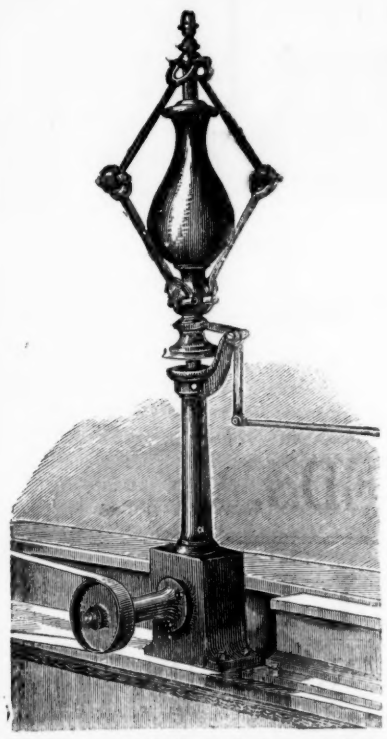

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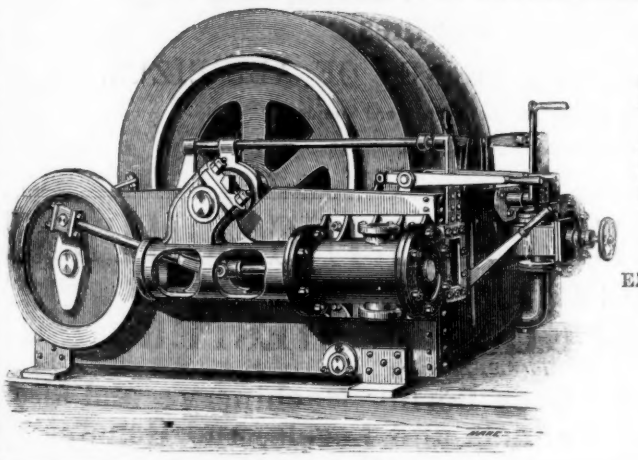

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| D,—12 in. | | „ „ | 4 ft. 6 in. drums. |

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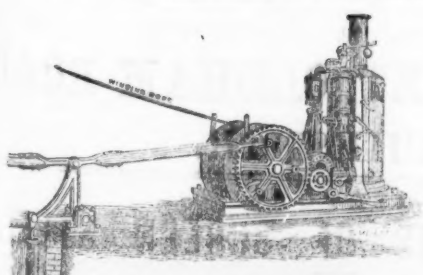
For Winding or Pumping, either separately or combined.



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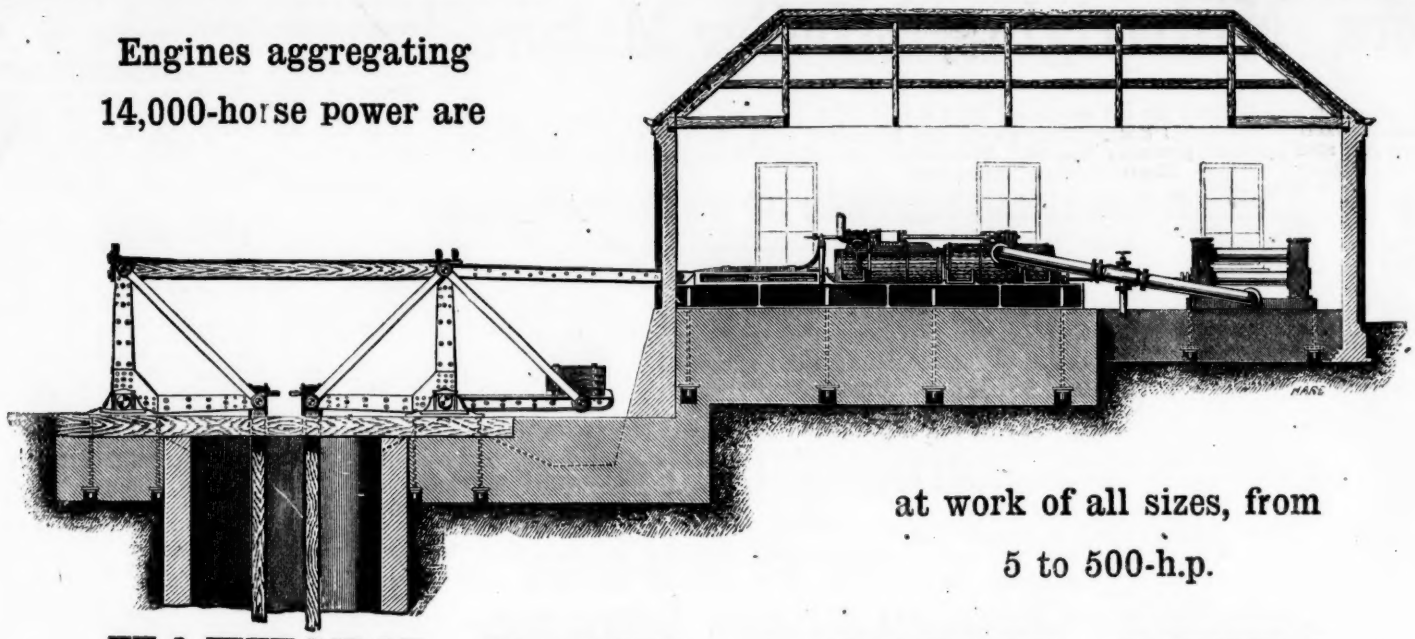

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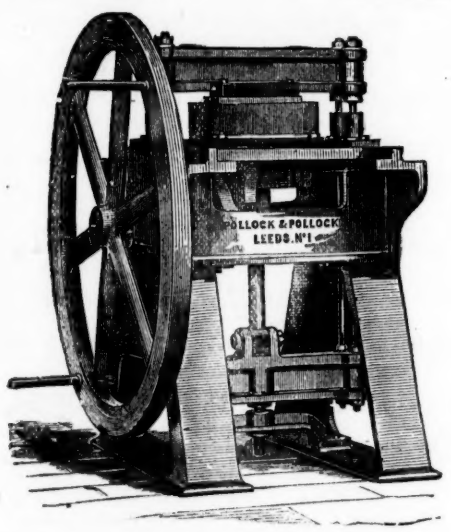


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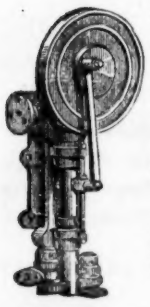

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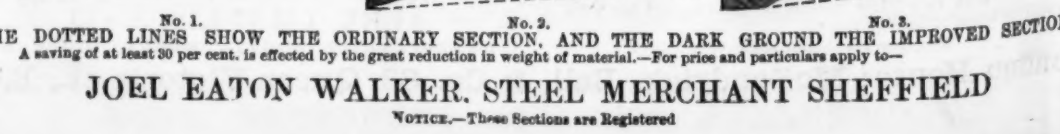

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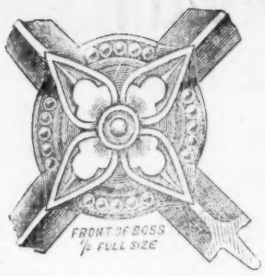


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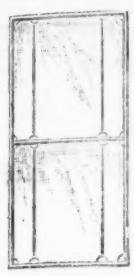
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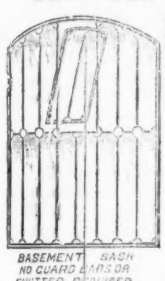
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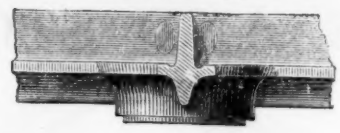

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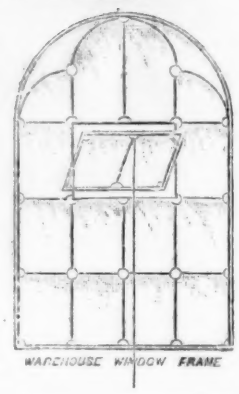
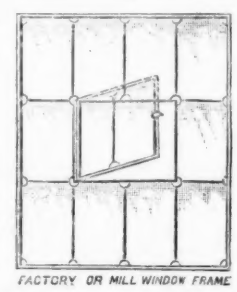

WAREHOUSE WINDOW FRAME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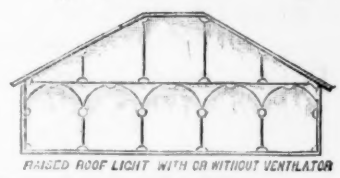
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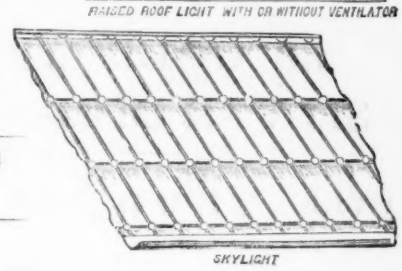
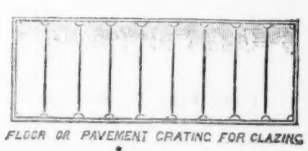

SKYLIGHT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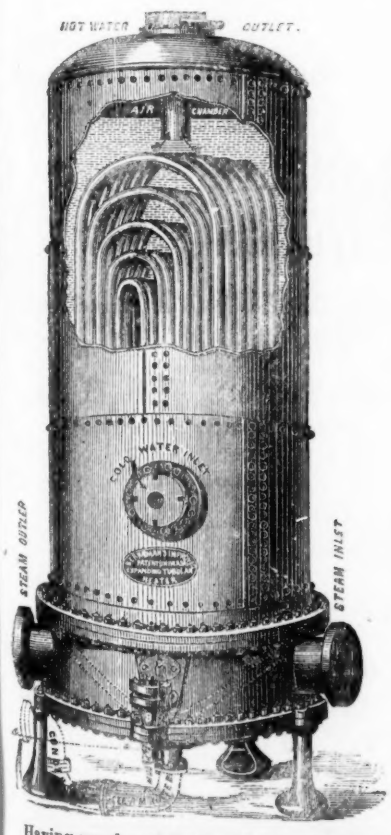


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## NEPTUNE FORGE ENGINE AND BOILER WORKS,

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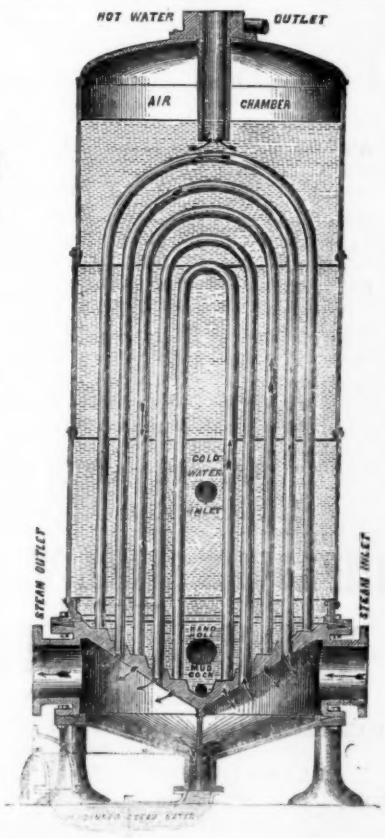


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This arrangement of BRASS TUBES of a great length giving an enormous HEATING SURFACE makes this HEATER not only the MOST POWERFUL ever invented, but its FIRST COST PER FOOT OF HEATING SURFACE IS LESS THAN HALF THAT OF ANY OTHER. It will condense the whole of the Exhaust Steam from the Engine if required, and entirely does away with the NOISE and BACK PRESSURE from exhaust pipes.

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Every part can be lined with BRASS, COPPER, or LEAD, as may be required in special cases for heating water or any kind of liquor in large quantities for CHEMICAL WORKS, BATHS, WASH-HOUSES, AQUARIA, GREENHOUSES, BREWERIES, WOOL WASHING, DYE WORKS, TANNERIES, &c., &c.; they will also HEAT AIR FOR CUPOLAS AND BLAST FURNACES, and are now at work as INTERHEATERS for compound engines with direct steam from the boiler with a further saving of 15 per cent.

The New Price List, with detail information, is now ready, and will be sent on application, together with an Illustrated Catalogue, with references and testimonials from Firms using FOUR HUNDRED AND THIRTY-THREE of these Heaters.

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# H. R. MARSDEN, PATENTEE AND ONLY MAKER OF THE WELL-KNOWN BLAKE MACHINES,

## ORE CRUSHERS AND STONE BREAKERS,

WITH THE

**New Patent Reversible**
CRUSHING OR CUBING
JAWS,

WHICH ARE CONSTRUCTED OF A PECULIAR MIXTURE OF METAL, WEARING

**Four times longer than any other.**

**60 GOLD AND SILVER MEDALS.**

OVER **2000** NOW IN USE.

**For Crushing to any degree of Fineness, or Breaking to a required size.**

**Her Majesty's Government**
USE THESE MACHINES
EXCLUSIVELY,
ALSO ALL THE GREAT
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H. R. M. has long observed the want of cheaper machines,

**STONE AND ORE CRUSHERS,**

And has at length, by means of improved appliances for the production thereof, been enabled to reduce the prices, yet keep up at the same time the well-known strength of construction. Reduced prices on application.

**FIFTY per Cent., and upwards, saved by using these Machines.**

TESTIMONIAL FROM MESSRS. JOHN TAYLOR AND SONS.

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DEAR SIR,—We have adopted your Stone Breakers at many of the mines under our management, and are pleased to be able to state that they have in all cases given the greatest satisfaction. We are, yours faithfully, JOHN TAYLOR AND SONS.

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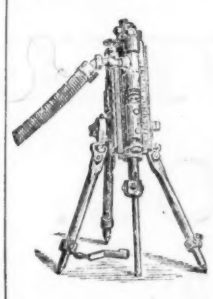

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